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A
CURSORY EXAMINATION
OF THE
METHODICAL SYNOPSIS
OF
MINERAL WATERS, &c.
And of the ARGUMENT of
SULPHUR OR NO SULPHUR
In WATERS DISCUSSED, &c.
BY WHICH
The moſt MATERIAL of the MANIFOLD ERRORS,
INCONSISTENCIES and MISREPRESENTATIONS of
their AUTHOR are fairly, though briefly, layed open.

IN A
LETTER
TO THE
Celebrated JOHN RUTTY, M. D.
Seriouſly recommended to the Peruſal
Of the Reading Subſcribers to the DOCTOR's Works.

BY C. LUCAS, M. D.
Author of the
ESSAY on WATERS, publiſhed in the Year 1756,
AND OF THE
ANALYSIS of DOCTOR RUTTY's METHODICAL
SYNOPSIS of MINERAL WATERS;
publiſhed in the Year 1757.

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M DCC LXIII.

BRITISH MUSEUM
30 MAY 56

SIR,

WITHIN theſe few days, I learned that you did me the unmerited honor of making a part of my writings the ſubject of your Animadverſion.

Hoping you had ſupplied the enormous defects in the knowledge of Chemiſtry and Natural Hiſtory, to ſay nothing of other branches of the Healing Art, diſcovered in your *Methodical Synopſis of Mineral Waters*, by my *Analyſis* of that maſſive, motley Work, or made ſame juſt corrections of mine; I ſent to inquire for this new Product of your Labors; but, to my ſurpriſe and grief, could not find it, till by accident, one of your Agents, employed in collecting the Subſcriptions for your laſt great and important performance, called on a gentleman whom I then viſited, and who, after he had returned you, in the fair way of barter and exchange, which you were once fond of, in the way of books *, a pamphlet of his writing of nearly the ſame volume with yours, made me a preſent of the invaluable product of the long Lucubrations of you and your no leſs learned and worthy *Junto*, calculated to overthrow the works of an Author, which none of you underſtand, and to make waters ſulphureous, in which a grane of brimſtone never did, nor could exiſt, in the ſtate of ſolution, for which you contend.

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* Analyſis of Dr. Rutty's Methodical Synopſis of Mineral Waters, p. 100.

I own, whatever you taught me to think of your underſtanding in Chemiſtry and Natural Hiſtory, I thought you too much a Chriſtian and a Gentleman, to utter a work, calculated not to defend or vindicate yourſelf ſo much as to calumniate and to miſrepreſent me, in ſo pitiful and ſecret a manner, that it could never unleſs by accident come into my Hands, before your injurious poſitions had made their intended impreſſion.

I ſurely did not treat you thus, when the manifold ſhameful and deſtructive errors of your pompous work, and the uncivil and diſingenuous treatment you gave me, called for the ſharpeſt Animadverſion. I red and analyſed your work, in about nine days, ſent the pamphlet to the preſs and advertiſed it publicly. I ſent it not to any friend of yours: I meaned you no perſonal injury; diſabuſing the public and vindicating the honor of our profeſſion, were my ſole motives, if perhaps reſentment of ſlights and apparent oppoſition, together with the want of common civility and candor on your ſide, had not ſome ſhare, in the manner, which I will not abſolutely deny.

However, when I heared of your writing againſt me, I expected nothing leſs than an attempt to confute what I had written againſt your great work, or a juſtification of yourſelf. But how muſt I have been diſappointed, when the titule of your leſſer work takes in but one point, the ARGUMENT of SULPHUR *or no* SULPHUR *in Waters diſcuſſed; with a compariſon of the Waters of* AIX-LA-CHAPELLE, BATH *and* BRISTOL: *Wherein, the Sulphur is reſtored to the* two firſt, *and the contents of the* laſt *are aſcertained with a ſomewhat greater degree of preciſion than in the* ESSAY *of a* late ADEPT; *and the injured credit of divers other ſalutiferous ſprings is vindicated from the* evidence *of that* Author*'s own* Experiments *corroborated by many others. Being the ſubjects of a correſpondence between the* Author *of the* METHODICAL SY-

NOPSIS of MINERAL WATERS and W. R. Eſq; *and ſome others*; *to which is annexed* a more explicit ACCOUNT of the NITRE *of the* ANTIENTS, &c. &c.

I ſhall ſay nothing at preſent, of the two annexed tracts *on Milk* and *Goats Whey*. Nor ſhall I inquire why you and your *junto*, who affect to ſneer at a *late Adept* and *Reformer* of our Language, do not write common Engliſh, even on your titule page. Let it ſuffice, that I ſhall call upon the whoſe Corps to prove the truth of their aſſertions, if not to expoſe their want of common knowledge in Chemiſtry and Phyſic, as well as of juſtice, judgement, candor, and common ſenſe.

But, before I come to examine the force of your poſitions, the poignancy of your ſatirical humour and wit, and your fund of learning and knowledge in this performance, give me leave to call upon you for an anſwer to the arguments made in the *Analyſis* of your *Synopſis*, to prove your manifold Errors and matchleſs Ignorance in every book, in every chapter, in every page of that pompous performance. This may be of uſe to the Public: For, if you have the candor to confeſs them, your book may be corrected by theſe animadverſions: If not, they muſt be taken for confeſſed, till you or ſome of your anonymous *junto* refutes them. For the ſake of truth, I muſt begin here, with ſtating the principal arguments or obſervations in their proper force; demanding, waiting for, your anſwer. And now we ſhall ſee how you attend to the ſenſible advice of your friend and correſpondent W. R. *and in your turn maintain a ſacred regard to the maxim*, which he has obſerved, *Fas eſt et ab hoſte doceri.*—See his Letter prefixed to your Argument.

To procede then, without further ceremony or circumlocution:—When you give a detail of the ſolid matters, with which you apprehend waters univerſally impregnated, in your preface and ſubſequent work; do you ever explane the means by which ſuch ſolid matters are diſſolved in waters? Or, have you any where ſo much as glanced at thoſe *fluid eſſences*, demonſtrated in the *Eſſay* on Waters, which not onely themſelves ſeverally or conjointly impregnate waters, but are the proper ſolvents of ſeveral other bodies, which enter the compoſition of waters? Such are 1. the *ſimple volatile mineral ſpirit*; 2. the *volatile mineral alcaline ſpirit*; 3. the *volatile, univerſal or vitriolic acid*; 4. the *phlogiſton* or inflammable principle of bodies; together with, 5. the *oily matter*, of which no water has as yet been found free? Have the exiſtence, nature, properties, or even the names of theſe, been ever known to you, before you found them in the *Eſſay* on waters? If theſe were well ſtated, why did you not give them a place in your book, according to your titule page promiſe? If not, why did you not expoſe them, as trivial, nugatory, imaginary, or falſe?

Do you not aſſert, in your preface, p. viii. that *there is ſcarce any chalybeate water without ſome mixture of Sulphur?* And is not *your Sulphur*, the *inflammable principle*, *oil*, *reſin*, *fat*, as well as *brimſtone*, and found in moſt parts of the creation in ſome form or other? Why pay none attention to the generic marks and characteriſtics of Sulphur?—*Analyſis*, p. 12.

Do you not every where confound *precipitator* and *precipitant* as with as *precipitand?* In the fourth *Quære* in your preface, do you not look upon the ſolutions of *ſilver*, *lead*, *alum*, and *lime*, as well as *alcalies*, to be *precipitators*, where in fact they are the *precipitands*, or give the *precipitates?* And conſider the *whiteneſs*, *coagulation* or *precipitation*, ariſing upon the mixture of theſe with waters, as the *earth* in the waters, by theſe ſolutions precipitated; when in fact, the ſolutions of theſe metals and earths are not the *precipitators* or *precipitants*, but the *precipitands*, the matter precipitated by the contents of the waters, which may be ſalts, fixed or volatile, acid or alcaline, or neuter, as well as by *earths?* See *Analyſis*, p. 13.

Do not you, who deſpiſe all reformation, and all accuracy and correctneſs of expreſſion in our language, confound the words *fermentation*, *putrifaction*. *effervescence*, and *ebullition?* See *Analyſis*, p. 14.

Though you are elſewhere forced to confeſs, that the *Nitre* of the *moderns* has never been found naturally in any water; do you not inſtitute means of inquiry for it in waters, in your 8th *quære*, which are vague and incertain? See *Analyſis*, p. 15.

Do you not make the reſiduum after evaporation of a water's *moiſtening in the air*, a teſt of *ſea ſalt?*— Do not the *vegetable alcalies*, as you ſay of the mineral, *moiſten in the air?* And where have you found that pure and perfect ſea ſalt moiſtens in dry air?

Do you not aſſert, that the emiſſion of acid fumes, upon the affuſion of oil of vitriol upon the reſiduum of any water, is a proof of ſea ſalt?—and are you not now made ſenſible, that *Epſom* ſalt, the evaporated *mother* of ſalt, *Salt Ammoniac*, *Diuretic Salt*, and *Nitre* yield acid fumes upon the Affuſion of the heavier acid?—are you not called upon to be more correct and preciſe in your expreſſions? *Analyſis*, p. 16.

Do you not uſe ſirrup of Violets to indicate, or give *ſuſpicion* of an *Alcali* in Waters?—what are we to judge from the greeneſs which ariſes upon the mixture of this ſirrup with waters impregnated with *abſorbent Earths* and *lime*, with *iron* and *copper* and *quickſilver*, and even with *alum*, apparently the *reverſe of an alcali?* Have you not uttered many contradictions, with reſpect to this, in your *Synopſis*, p. 261. twice in p. 205 and 216. See *Analyſis*, p. 17.

In p. 11 and 12. of the preface to your *Synopſis*, do you not confound the fixed and volatile, native alcalies? Do you not confound ſalt ammoniac and ſalt of tartar in their effects? And what is ſtill more abſurd and falſe, if poſſible, do you not ſay, that *if an urinous or pungent ſmell be excited upon rubbing the reſidue of any water with ſalt of tartar, that it is a proof of natron or* the *nitre* of the antients? Is not this the native fixed alcali? and ſo analagous to the artificial, to ſalt of tartar, that no change ariſes upon their mixture? Do you not then confound natron and ſalt ammoniac? Yet do you not procede in your experiments, under theſe deluſions? Have you yet corrected or retracted theſe ſhameful errors? Or do you procede to examine the *three hundred and nine* waters, you boaſt of analyſing, upon theſe falſe principles? See *Analyſis*, p. 17, 18.

Do you ſtill inſiſt on it, that your blank tables, *made with intent to throw light upon the intricate ſubject*, anſwer your purpoſe? See *Analyſis*, p. 18, 19, 20.

Do you not aſſert, in p. 2. of your *Synopſis*, that the pureſt waters are derived from the higheſt mountanes, while all the antient and modern writers, by common conſent, contradict you; the *Alpine* waters being the hardeſt and groſſeſt known? See *Analyſis*, p. 21, 22.

Do you not aſſert, that *hard waters are the beſt waſh for ſore eyes*, without diſtinction? See *Synopſis* from p. 5 to 7. Do you recommend this in practice? See *Analyſis*, p. 21.

Do you not give us the *Hydrometre* as the ſureſt method of aſcertaining, not the relative, but the ſpecific gravity of waters, *Synopſis*, p. 7? Yet is not the inſufficiency, the falacy of this inſtrument inconteſtably expoſed in the *Eſſay* on waters? See *Analyſis*, p. 22.

Do you not rely much on the trial of waters by lathering with ſope? And are you not now convinced, and by whom, that lathering is an uncertain teſt, as ſome of the moſt hard waters, and all who are charged with a volatile acid, muſt lather with a ſufficient quantity of ſope and agitation? And are you not taught, and by whom, that ſope in ſolution onely affords the deſired teſt? See *Eſſay* on waters, P. I. p. 104, 105. and *Analyſis*, p. 22.

Do you not, agreeable to your principles, in your preface, lay it down, that the quantity of *terreſtrial matter* in a water is determined, by the quantity of ſediment ſubſiding, upon the inſtilling the ſolutions of *ſilver*, *lead*, *alum* and *lime-water?* And are you not now convinced of your error, and by whom, and that ſalts, as well as earths, in waters cauſe the precipitations with theſe ſolutions, and that the precipitates are from the ſolutions, not from the waters? See *Analyſis*, p. 13, 22, 23. Do you ſtill obſtinately perſiſt in theſe glaring errors?

Do you not confine the curdling of milk to *your nitre*, or as you ſometimes call it, *calcarious nitre*, or *Epſom* ſalt? And are you not now convinced, and by whom, that the union of the Vitriolic or Muriatic acid, to moſt abſorbent earths and Alcaline ſalts, in certain quantities, produce the ſame effect?

Do you not lay down, as one of the eſſential criterions, by which ſulphur is to be diſcovered in any water, the *ſparkling and ſtinking of the ſediment on a red hot iron?* And have you not been ſince informed, and by whom, that not onely all the known *ſweet* or *ſimple* waters, but all the *vegetables* and *animals*, and moſt of the *minerals* in the creation contain *ſuch brimſtone?* yea, even that you yourſelf daily caſt off brimſtone in all that paſſes off from the common emunctories of your body? And can you deny it? See *Analyſis*, p. 24.

Would it not then be more juſt and honeſt, as well as prudent, to learn and eſtabliſh the definition of ſulphur, and its characteriſtics and properties, as layed down in the *Eſſay* on waters, P. III. § 79 to 87? would not this have prevented the confuſions into which you ſo frequently fall throughout your whole works, eſpecially the laſt, *the argument*, in which you not onely take the *inflammable principle*, but almoſt every *combination* of it with other bodies, for that very ſingular concrete, *ſulphur* or *brimſtone?* But of this, more hereafter.

Do you not, *Synopſis*, p. 11, 12. charge to earths, lime, or what you call *calcarious* earths, the effects they produce on ſalt ammoniac and corroſive ſublimate? Do you not ſay, that ſuch ſediments emit a pungent ſmell with ſuch a ſalt, and turn red or yellow with the ſublimate? And are you not now informed, and by whom, that the reverſe is the truth; *to wit*, that the ſalt and the ſublimate, not the earth or lime, ſuffer the changes? See *Analyſis*, p. 25. Does not truth and perſpicuity demand this preciſion?

Yet do you not, in p. 12. lay down theſe and other ſuch like *falſe* and *abſurd poſitions*, as *principles?* Are you not now, and by whom, convinced of your errors? yet have you had the ſenſe or manhood to retract?

Do you not aſſert the *alcaline baſes* of ſea ſalt and nitre to be *terreſtrial matter*, when the moſt ignorant pretenders to chemiſtry know the baſis of each to be a *ſalt*, the one the *native*, the other, the *artificial fixed, alcali?* See *Analyſis*, p. 26.

How unfit muſt you be to make experiments on waters by *precipitation*, who are confeſſedly ignorant of the etiology of the proceſs? Do you not expreſsly aſſert, *that when the ſolution of ſilver is dropped into any water, charged with ſea ſalt, that the terreſtrial matter in the ſalt*, (which every one knows to be a ſalt) *partly precipitates the ſilver, and is itſelf partly precipitated?* And have you not ſince learned, and from whom, that the *acid* of ſalt, *abſtracted* from all *terreſtrial and alcaline* connexion, is one of the moſt effectual *precipitants* of ſilver, as well as of *quickſilver* and *lead?* and that theſe *precipitates* are *not earths?* Should you not have known this, before you preſumed to lay down *axioms and principles*, on which ſuch experiments were to be founded? See *Analyſis*, p. 27, 28.

Do you not in the ſame breath, in the like falſe and abſurd manner, account for the precipitation of the ſolutions of *lead* and *alum*, and *lime-water*, in any water? and look upon theſe, which are actually the *precipitands*, as the *precipitators*, as you call them, or the *precipitants*? *ibid.*

In the 13th p. of your *Methodical Synopſis*, do you not give the *melting* and *bliſtering* of the reſiduum after evaporation of a water, as proof of its containing nitre, that is, *your nitre*, which is but *Epſom* ſalt? while the moſt ignorant pretenders to chemiſtry know, that in general, all ſalts melt, and that *borax*, *alum* and *vitriols bubble* or *bliſter*? And in the ſame page, 9th article, do you not mention *natron*, as a *neuter ſalt*, while you have been well aſſured, by competent authority, that it is the *native alcali*, the nitre of the antients? See *Eſſay* on waters, and *Analyſis*, p. 29. and are you not forced to confeſs this in *your argument*, *account of the nitre of the antients*?

In your *Synopſis*, p. 51. are you not pleaſed to give us this unfortunate *ſcholium*, viz. *The terreſtrial matter in ſalt-petre is ſo cloſely combined with the acid, as not to be ſeparable by the admixture of any alcali: for, that ſalt-petre contains a conſiderable proportion of terreſtrial matter, appears from the* Magneſia alba, *one of the methods of preparing which, is from ſalt-petre?* And are you not by now convinced, and by whom, that you know nothing of *ſalt-petre* or *magneſia alba*? When ſaltpetre is complete, does it not conſiſt of its ſpecific acid and a vegetable fixed alcali? Can a fixed alcali precipitate any thing from ſuch an union? Your apothecary can anſwer you in the negative. Yet, do you ſtill perſiſt, that ſaltpetre contains a conſiderable proportion of terreſtrial matter, and inſtance *magneſia*? Pray, aſk your apothecary how and whence true *magneſia* is made ; and will he not inform you, that a ſolution of pure ſaltpetre will not be varied by the addition of an alcaline ley ; but that the *mother* of nitre, as it is called, the ley or ſolution of the crude or immature ſaltpetre, ſuffers a precipitation upon the admixture of a fixed alcali ; in which, what is called *magneſia alba* is ſeparated, and pure ſaltpetre formed, which no alcali can alter ? Is it thus you give the world a *Methodical Synopſis ?* a work *intirely new ?* What crime ſo heinous as ſhewing its deſtructive errors ? None ſurely, with you ! See *Analyſis*, p. 30, 31.

Do you not take up two chapters in confounding what you call *calcarious nitre*, natural or artificial Epſom ſalt, with the immature, mural nitre, whence the nitre of the moderns, ſaltpetre is made ? Do you not in the ſequel inlarge and eſtabliſh this confuſion, by taking *Epſom* ſalt for real *nitre*, and calling all waters, impregnated with any *priſmatic* ſalt, *nitrous*, in imitation of your worthy patron and coadjutor, Dr. *Short*, who never fails of calling every priſmatic cryſtalliſation from waters, *nitre ?* Have you retracted this among other detected errors ? Why then remane inraged againſt the detector ? Is it becauſe you are charged with having never ſeen the far greater part of thoſe waters, you bring under this claſs or denomination, in the natural ſtate ? *Analyſis*, p. 30, 31, 32, 33, 34.

What groſs and manifold errors do you foſter in your third book, in ſpight to the ſeaſonable admonitions of the *Eſſay* on waters ? Among the reſt, do you not aſcribe to *ſea ſalt*, the *liquefaction* of pure fixed *alcalies* in the open air ; though it be certain, that pure and *perfect ſea ſalt* does *not liquify* in ordinary dry open air, and that, though it did, no veſtige of ſuch a ſalt can be ſhewn in *pure alcalies ? Analyſis*, p. 34.

In your *Synopſis*, p. 146, 147. do you not run into groſs confuſion and ſome errors, *intirely new*, regardleſs of the truths layed down in the *Eſſay* on waters? Do you not tell us, that ſea water is of a *green colour*, or a mixture of *green* and *blew*; while all authors agree with the *Eſſay* on waters, that held in a glaſs, it appears limpid and colorleſs? *ibid.*

Do you not attempt from *putrification* to prove the *ſulphureous qualities* of ſea water? Why not prove it *ſulphureous* in the *natural ſtate?* For, though, in this ſtate, you did not ſee one in twenty of thoſe waters, of which you pretend to give us the Analyſis; yet you were not too far from the ſea, to get its water in perfection. But ſea water *putrified*, you look upon to be *ſulphureous*. I grant, that in this ſtate, it has every characteriſtic of all the *ſulphureous waters*, you have yet ſeen or upon your own authority, ſet forth. Now, Sir, are you able to ſhew any water, that may not, by various accidents, become *putrid*, and give the like proofs of being *ſulphureous* with *putrid ſea water*, upon your plan? Have you not ſeen ill corked waters from *Briſtol*, *Spa*, *Pyrmont*, *Selterz* and many other ſprings, as well as rivers, which neither you nor any other perſon *ſuſpected ſulphureous*, become *putrid*, *ſtink*, and *tinge ſilver yellow*, and in ſhort, give every other of *your proofs* of being *ſulphureous*? Then will it pleaſe you to ſhew us a water, that is not, in your ſenſe, *ſulphureous*? See *Analyſis*, p. 35.

In p. 149. of your *Synopſis*, we are ſurpriſed at your finding *tartar*, before your diſcovery, the product of wine alone, in ſea water? it muſt be confeſſed, the diſcovery is your own, *intirely new*. But to the proof, my good Doctor; for chemiſts, you know, are to take nothing upon truſt. But of this, you are pleaſed to ſay not a word more. *Analyſis*, p. 35, 36.

In your matchleſs *corallaries*, *Synopſis*, p. 151, do you not give us *ſulphur* and *bitumen* as component parts of ſea water, yet without a ſingle proof, while the cleareſt trials prove ſea water void of *ſulphur* and *bitumen*, as well as of *unctuous matter*? See *Eſſay* on waters, P. II. p. 54, 55, *&c.* *Analyſis*, p. 36.

But pray, if the ſea water be *ſulphureous*, and *harrogate ſulphureous*, as you contend; ſince *both* agree in being ſalt, pray in what does the *later* eſſentially differ, from the *former*, eſpecially when *putrified*? And do not all your *ſaline* waters become, in *your ſenſe*, *ſulphureous*, upon *putrifaction*? *Analyſis*, p. 36, 37, 38.

Have not theſe arguments been ſet in a clear light in the *Eſſay* on waters? Was it not incumbent on the author of a *Methodical Synopſis* on the ſubject, profeſſedly taking in all that treated on mineral waters, to give theſe their due weight, or to refute them?

Do you not contend for an *acid* and an *alcali*, at *once exiſting*, *unaltered*, in *Spa* waters, while the *Eſſay* on waters places it in a clear, different light? And while this tract proves a ſubtil, mineral acid predominant in Spa and all ſuch waters, to taſte, as well as on experiments, why attempt to diveſt theſe of the titule of *acidulæ*, and give it onely to *vitriolic* and *aluminous* waters? *Analyſis*, p. 38, 50.

Do you not give *lime* or *chalk* as the baſis of *alum*[*], which the *Eſſay* on waters, with the joint conſent of all modern writers, proves to be compoſed of the *vitriolic acid* and a *ſpecific earth*, which is looked upon as a *vegetable mineraliſed*?

Do you not in the ſame place aſſert, that *artificial alum* may be made, not only with *lime* and *calcarious earths*, but with *potters* and *tobacco-pipe clays*, and other *non-abſorbent*, or inſoluble earths? Good Sir, are you ſtill ignorant, that an union of the *vitriolic acid* with *lime*, *chalk* and other *abſorbent* earths, conſtitutes the *ſelenite*? and that *non-abſorbent* earths are *inſolable* in this and all other *acids*? *Analyſis*, p. 39.

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[*] *Synopſis*, p. 215.

Do you not give us*, as an *important obſervation* or diſcovery of *Boerhaave*, that there are but *two* vitriols, though the *Eſſay* on waters has proved the exiſtence and characteriſtics of three? And do you not in the ſequel†, ſtumble upon the *third*, without knowing what it is, though you had the means of better information? *Analyſis*, p. 39.

Do you not overlook the hiſtory and analyſis of the *Pyrite*, given in the *Eſſay* on waters, and aſſign the *abundance* of *ſulphur* in this concrete, as the cauſe of it's *ſtriking fire* with ſteel? Have you then found *ſulphur* to *abound* in *flint* and *agate*? Is the concluſion juſt? See *Analyſis*, p. 40.

What confuſions do you not make between the *vitriol* of *iron* and *ſal martis*, both of which, equally pure, muſt be one and the ſame? *Analyſis*, p. 40.

Do you not give *ſulphur* to the *martial vitriol*, without any proof, nay contrary to the fulleſt teſtimony of the reverſe? *Analyſis*, p. 41.

Do you not‡, look upon iron as an *alcali*, in order to countenance a falſe poſition, with which you ſet out, that *alcalies alone* change ſirrup of *violets green*? *Analyſis*, p. 41.

Do you not confound your experiments with galls, by uſing the powder inſtead of an infuſion? *Analyſis*, p. 42. And have you not ſeen a better method? and where?

Do you not give *white vitriol* the preference to *green*, in making ink? upon what authority? No better than telling us, that *white vitriol* is compoſed of *alum* and *iron*, *above half alum*, you ſay, to the *vitriol* of *iron*? Yet have you not, in your heart, been convinced, and by whom, that all this is falſe; and that the *white vitriol* conſiſts of *zinc*, with ſome *copper* and the *acid* of *vitriol*? That *zinc* precipitates *iron* diſſolved in *every acid*? And conſequently, that *iron* and *zinc* cannot exiſt together in the ſame cryſtalline concrete? See *Analyſis*, p. 41. And is not the redundance of alum in common green coperoſe, the cauſe of the failure in dying good black, as well as in making durable black ink?

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* Ibid. p. 220. † Ibid. p. 231. ‡ Ibid. p. 235.

In treating of *chalybeate waters* *, do you not aſcribe to the *different degrees* of the impregnation with *iron*, that ſome of theſe like waters retain the property of tinging black with galls, longer than others? And are you not convinced, and by whom, that this property depends not ſo much upon the *proportion* of *iron*, as upon the *fixity* or *volatility* of the ſolvent, by whoſe means this metal is ſuſpended in the water? And is it not upon theſe principles, that the abſurd notions and poſitions of you and your *honored predeceſſors*, *patrons* and *friends*, Doctors *Short* and *Shaw*, &c. of *volatile vitriol*, *volatile ſteel*, *volatile iron*, &c. are exploded? See *Analyſis*, p. 43, 44.

Do you not appear quite ignorant of the true cauſe of the ebullition produced upon adding acids to chalybeate waters? And have you not ſince learned, and from whom, the true etiology? Why not adopt and give it to the public, or refute and reject it? *Analyſis*, p. 44.

Do you not aſcribe the Spa waters readier tinging with galls, when expoſed to the air half an hour, than newly taken up †, to the *occult cauſe* of *the particles, by means of contact with the air, forming themſelves into larger combinations?* And have you not ſince learned, and from whom, that the true cauſe of this is the *fugacity* of the *ſubtil ſolvent* of the metal, which, while predominant, prevented the precipitation neceſſary for dying? *Analyſis*, p. 45.

Do you not ſhew yourſelf wrapped up in perplexity, obſcurity and error in touching upon the ſeaſons, in which the waters of Spa are ſtrongeſt and beſt §? And yet have you not ſeen theſe fairly elucidated, and where?

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* Ibid. p. 242, 243, 244. † Ibid. p. 245. § Ibid.

In giving the ſenſible qualities of *iron*, * do you not ſay, *it has neither ſmell nor taſte?* Yet who that has theſe ſenſes, and ever touched iron, or put it in his mouth, that muſt not contradict you?——Do you not confeſs it's taſte, when you ſay a water, &c. has a *ferrugineous* taſte?——And do you not put a *large mixture* of ſulphur into the compoſition of this metal; though all the *Tyros* of the chemic art know, that *ſulphur deſtroys the malleability*, not onely of *iron*, but of *every other metal*, with which it is incorporated? *Analyſis*, p. 45, 46.

However, upon this ſuppoſition, you judge *Chalybeate waters* muſt be *ſulphureous*: never conſidering, that had there been *ſulphur*, the acid would, ſo far from *diſſolving*, *prevent* it's *ſolution*; and that in the action of ſolution, even the *phlogiſton* or inflammable principle, moſtly flies off, or with the vitriolic acid, partly runs into ſulphur, which that very acid keeps from diſſolving. Are you not now convinced of theſe truths, and by whom? And why do you not retract and amend?

If *Iron* be to be ranked among *abſorbents*, as you contend, becauſe it blunts the acidity of it's ſolvents; muſt not *lead* be a more powerful *abſorbent*, that more ſenſibly ſweetens it's ſolvents. *Analyſis*, p. 46.

Do you not applaud and quote *ab Heers*, who hardly knew a principle or rule of chemiſtry, for his comparing *Spa* to a mere *vitriolic water?* And are you not now convinced, and by whom, that it cannot be enumerated among *vitriolic waters?*

Is not your practice as incoherent and contradictary, as your experiments and notions of the impregnations of the waters of *Spa?* And have you not been offered, and by whom, the means of correcting and rectifying both? *Analyſis*, p. 46, 47, 48, 49. Do you not recommend the *warming* theſe waters, † while

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* Ibid. p. 246.

† Ibid. p. 254. 317.

while you muſt have been convinced, that they are *decompoſed*, in ſome meaſure, by every degree of heat? *Analyſis*, p. 49. 54.

Do you not* aſcribe to the Compoſition of *copper*, *ſulphur* and a *peculiar acid*, which you call the *ſpirit of verdigriſe?*—Yet, though you have been offered the means, have you corrected or retracted theſe moſt abſurd and ridiculous errors? *Analyſis*, p. 50.

After a long detail of experiments on this metal and it's ſolutions, have you given the etiology of one, or drawn any uſeful inference or concluſion?

Do you not, contrary to the cleareſt evidence of a predominant acid, even ſtrong enough to diſſolve iron, in *Spa* water, attempt to take the titule of *acidulae* from theſe and ſuch like waters, to which it appertains, and give it to the *vitriolic*, to whom it improperly belongs†? And do you not, againſt the fulleſt conviction, aſſert the exiſtence of *volatil* and *fixed vitriols?* See *Analyſis*, p, 38, 50, 51.

Do you not treat the moſt *curious* and *rare* waters, as *common Chalybeate* waters, without ſo much as ſhewing where they are *common?* *Analyſis*, p. 52.§

Pray what is the difference between *your mineral* and *metallic ſulphur?* Is there any other than ſome accidental differences of ſulphur, which throughout the creation is one and the ſame thing? why your diſtinction then? *Analyſis*, p. 56.

Do you not aſcribe the *ebullition* ariſing upon dropping *acids* into theſe waters, to *calcarious abſorbent earths*‡? And is it not made evident to you, and by whom, that this ebullition is inconſiderable, when the water is ſpoiled of it's *volatil parts?* Why is not this argument then, ſtated in the fair light? *Analyſis*, p. 58.

Do you not in the trial of the firſt of your *common Chalybeates*, the only ſpring of it's kind known, truſt to your little *ivory hydrometre*, whoſe uſe you have ſeen, in the trials of theſe like waters, with inconteſtable juſtice, exploded? See *Analyſis*, p. 52, 53.

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* Ibid. p. 257.

† Ibid. p. 265.

§ Ibid. B. iv. p. ii.

‡ Ibid. p. 394.

Do you not overlook the firſt material *phænomenon* in the evaporation of *Pyrmont* and *Spa* waters; when it was evidently demonſtrated to you in the *Eſſay* on waters? *Analyſis*, p. 53.

Is not your *practice* ſhewn to be as *abſurd* and *contradictary* in this, as in the other *chalybeate waters?* And do you not direct the *ſpoiling* Pyrmont water, as if to ſquare it to *your own rules* of practice? *Analyſis*, p. 53.

Do you not run into the like errors and puzzling mazes in your trials of *Spa* water and it's uſes? And are you not forced, after your manifold unexplaned, perhaps to yourſelf inexplicable, experiments, to conclude with a blundering writer, *that an artificial ſpaw, may be made by mixing ſalt of tartar and ſpirit of vitriol with the common Chalybeate waters?* Are you not here treating of *your common*, though generally reckoned, the moſt rare and curious, *Chalybeate waters?* Are not theſe *Pyrmont and Spa?* And muſt *ſalt of tartar* and *ſpirit of vitriol* be added to make theſe, what? what they are pronounced before, *common Chalybeate waters*, or to make *theſe* into *Pyrmont* or *Spa* waters? Is not this like the ſtory of the *fiſherman*, or of the *killing* of *Prince Prettyman*, in the *Rehearſal?* For ſhame! learned Doctor! Theſe matters have been fully and fairly layed before you, yet ſtill you perſiſt in wilful ignorance and error! See *Analyſis*, p. 55, 56.

Will you pleaſe to give us the diſtinguiſhing characteriſtics of your *ſpiritualiſed ſulphur?* Do you mean the *ghoſt* of *brimſtone?* Alas! *poor ghoſt!*

Will you pleaſe to inform us, which of your *junto* has diſcovered *vitriolate tartar* in *Spa* or *Pyrmont* water, which muſt be the reſult of *your propoſed imitation?* And give us, if poſſible, ſome idea of your *highly volatile iron*, which with the *ghoſt* of *brimſtone*, you give to the *Geronſter ſpring**?

Why

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* Ibid. p. 326.

Why do you inſiſt that the water of this ſpring does not bear carriage *, when the contrary is planely proved to you ?

Do you not again confidently aſſert †, that *the native alcali is a kind of ſal ammoniac, yielding, like that a volatile alcaline ſpirit with fixed vegetable alcalies ?* Is not this a contradiction in terms, as it is falſe in fact ? Does not the *native* fixed alcali produce the ſame or the like effect with the *artificial*, on ſalt ammoniac? Has not this been ſhewn you over and over? And are you yet convinced or reformed ? *Analyſis*, p. 57, 58.

Do you not confeſs theſe *two alcalies* to be *ſimilar*, when you ſay that each ſerves to *diſſolve ſulphur ?* Is this true of ſalt ammoniac, in the ſame ſenſe ?

Do you not give this *mineral alcali* as the medium by which *ſulphur* is rendered intimately *miſcible* with water ? Yet have you, or any one who aſſerts this, ſhewn ſuch a *natural ſolution* of *ſulphur* in water ? Has it not rather been proved to you, that an *acid* is found to predominate in confeſſedly the moſt *ſulphureous* water known ? *Analyſis*. p. 59, 60.

You give us a claſs of *Alcaline waters :* Yet let me aſk you, Sir, is there not an *acid* manifeſtly *predominant* in every water you inſtance ?

Do you not boaſt of having proved the co-exiſtence of an *acid* and an *alcali* in the ſame water? And can you now judge this poſſible ? *Analyſis*, p. 61, 62.

Do you not allow, with the beſt writers, that *Selterz* water contains no ſalt but the *natron*, the fixed mineral or *native alcali* § ? Yet do you not afterwards aſſert, that this water ſaturated with the *acid* of *vitriol*, yields *vitriolate tartar ?* Can this be true, when this union muſt neceſſarily produce *Glauber's* ſalt, as that acid and the vegetable alcali alone can give vitriolate tartar ? See *Analyſis*, p. 62, 63.

Do you not immediately after, miſtake *ſea ſalt*, for its *alcaline baſe ?*

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* P. 327.

† Ibid. p. 408.

§ Ibid. p. 440.

When you come to form your next claſs of *waters charged with natron and ſulphur* *; do you not run into inextricable confuſion? And though you muſt ſince have ſeen the abſurdity of deſcribing a *black water*, and inſiſting on waters of this kind being univerſally *ſolutions* of *ſulphur*, by the means of a *mineral alcali*, have you yet retracted, or any where corrected your errors? *Analyſis*, p. 64.

After this, do you not endeavour to eſtabliſh a claſs ſtill more abſurd, of *waters impregnated with natron and iron?* A *metal* diſſolved by an *alcali!* Sure you are the firſt who ever diſcovered ſuch a proceſs in nature! And ſure you are now ſenſible of your error; yet do you not retract!

But, of all your *curious diſcoveries* and more curious claſſings, none equals your bringing the well known *urine* of an *animal*, under a vulgar name latiniſed, *aqua florum omnium*, into a *methodical ſynopſis of mineral waters!* Is not this one of *your ſulphureous* waters? Does it not, like theſe, when *putrified*, *tinge ſilver yellow?* And does not it's *reſiduum* after evaporation, thrown upon a *red hot iron*, *fume*, *ſparkle*, *burn* and *ſtink?* Are not theſe your *chief criterions* of *ſulphur*? Have you not learned better, and have you confeſſed it or amended? See *Analyſis*, p. 64, 65, 66.

Do you not inform us †, that *cryſtal* is ſometimes found *diſſolved* in waters? But how does this appear *feaſible* or *diſcoverable?* Or is there any better authority for it, than ſome poet's calling water the *cryſtal flood* or *ſpring*, *or ſtream*, or *brook?*

Do you not tell us of *ochre* diſſolved in water? And can you ſhew this otherwiſe than by it's ſeparation from water? And is *iron* to be ſeparated in any other form, when diſſolved in any water? This you muſt have learned; yet correct not your error! *Analyſis*, p. 68.

You often mention *calcarious earths*, as ingredients in waters, particularly in p. 477, as well as elſewhere.

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* Ibid. p. 443.

† Ibid. p. 463.

Yet are you not now made ſenſible, and by whom, that not onely in *your calcarious waters*, but in all waters that contain earth, the *earth* is *never ſimple*, but contains with the *calcarious*, *ſelenite*, *gypſe* or *talc* ?

Do you not give the petrifying ſpring at *Knareſborough*, *ſulphur*, contrary to the general judgment, and even to your own experiments ? *Analyſis*, p. 69.

As you before gave us a *black water*, you now are pleaſed to give us a claſs of *white waters* *. And are you not convinced, that both the *blackneſs* and *whiteneſs* are accidental, not eſſential, to the waters, as by ſtraining or ſubſiding both muſt become colorleſs and clear ? *Analyſis*, p. 69, 70.

Are you ſo looſe ſtill in your *ſynoptical* method, as under the head of *petrifying*, to give us *oily* and *bituminous* waters † ?. Where is the Analogy ? *Analyſis*, p. 70.

Yet in the ſequel, do you not ſhew, you mean to conſider *oils* and *bitumens* onely as *ingredients* in water, without ſhewing a ſingle water, that is truly *oily* or *bituminous* ? *Analyſis*, p. 70, 71, 72, 73.

Do you not arrogate to your ſelf and your worthy patron and predeceſſor, Dr. *Short*, the *diſcovery* of *ſulphureous waters* in *England* and *Ireland* ? Yet, who, beſides him and you, are ſenſible of any ſuch water in either kingdom, agreeable to your notions ; unleſs in your looſe and incoherent definition of the word *ſulphur*, which with you, means every *combuſtible*, as well as *brimſtone ? Analyſis*, p. 74.

Do you not inform us, that you ſubjoin theſe *your ſulphureous* to your *bituminous* waters, on account of the *analogy* between *bitumen* and *ſulphur ?* Yet can you ſhew us more analogy between theſe, than between *reſin* and *brimſtone ?*

But, give us leave to examine your account and definition of *ſulphur*. Do you under this abuſed word, comprehend all *oily fat* or *inflammable ſubſtances* in the *animal*, *vegetable*, or *mineral kingdoms?* Was this done, that you may not be contradicted, when you call *bitumens* or *oils* or *reſins* of vegetables, or the *fat* or *greaſe* of *animals*, or *tartar*, or *ſugar*, or *yelks* of eggs, or any thing elſe that is *combuſtible*, *ſulphur?* *Analyſis*, p. 74.

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* Ibid. p. 484. † Ibid. p. 485.

Sometimes, does not the word *ſulphur* imply with you, *phlogiſton*, or the inflammable principle of bodies, which is one and the ſame ſimple and invariable eſſence, throughout all parts of the creation? Is it not to this you allude *, when you mention the *native mineral ſulphur of metals*; alledging it to be the ſame with that of animals and vegetables? If you do not mean this, what do you mean, when you tell us, there is *no metal free from ſulphur?* and that *putrifying bodies* in ſewers and jakes, agree in effects with *ſulphureous waters?* See *Analyſis*, p. 74. And when you tell us, that *putrifaction* manifeſts the *ſulphur* in divers *waters?* So that *without putrifaction*, we can have no evidence of *your ſulphur* in any water! And *putrifaction* will manifeſt *your ſulphur*, not onely in every water, but in every *combuſtible body*, capable of reſolution by putrifaction! Who then can contradict you, when you aſſert any water to be *ſulphureous?* But where will you ſhew a water that is not ſo?

But, that you may not be found confined to *one ſtring* to *your bow*; do you not add to your *ſulphurs*, common *brimſtone?* Is it not this you mean, when you give us your curious *criteria*; ſuch as an *hard and friable concrete*, *that is not malleable*, and which you tell us conſiſts of the *univerſal acid and bitumen*; though all the writers of character before you are agreed to demonſtration, that *ſulphur* conſiſts of the ſimpleſt *native acid* and the *ſubtil eſſence*, by modern chemical philoſophers called *phlogiſton*, or the inflammable principle of bodies? *Analyſis*, p. 75.

While

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* Ibid. p. 504.

While you keep to *this*, the *friable*, that is not *malleable*, we underſtand you mean *brimſtone*. Do you not tell us *, that *this*, which you are pleaſed, pertinently, to call *reſina terræ*, is *quite different from every kind of ſalt*, as *it is neither miſcible with water, nor ſoluble with acids?*

Do you not agree that *it is not ſoluble* in water, but by means of an *alcali?* And do you not point out this as the *onely means* of impregnation of water with ſulphur, *means* which you ſay are *abundant* in all the *hot as well as cold ſulphureous waters* †? Are we not then from your own words, to look upon all *your ſulphureous waters*, as *ſolutions* of this mineral by means of a *fixed alcali?* But how will you get over this, when it is confeſſed by you, as well as others, that in all the *ſulphureous waters* you mention, an *acid* is found predominant? *Analyſis*, p. 76. But obſerve in the ſequel how you are pleaſed to make this abſurd poſition mine, in your *argument!*

Do you not afterwards, to give us the clearer ideas of *your ſulphureous waters*, ſhew us, by the example of *Boerhaave*, that *fixed alcalies* and *lime* are the *onely means* of rendering *ſulphur ſoluble* in water? Do you not make experiments on ſuch *artificial ſolutions*, and ſhew us, what all the world before you knew, that as *alcalies are the proper ſolvents of ſulphur*; ſo *acids are the proper precipitants of ſuch ſolutions* ‡?

Theſe being your ideas of *ſulphureous waters*, pray how comes it to paſs, that in all the examples of *ſuch waters*, which you produce, an *acid* is confeſſedly *predominant?* Can this and the *alcaline ſolution* of ſulphur exiſt together? *Analyſis*, p. 77, 78.

Yet notwithſtanding theſe glaring contradictions, do you not procede to compare the effects of the *artificial ſolution* of ſulphur upon metals, with thoſe of *your ſulphureous* waters? And are not *theſe* the ſame with the *effects* of *putrid animal* and *vegetable* bodies, and thoſe of the *roſte yelks* of eggs? Are they to be relied on, without further and clearer proofs?

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* Ibid. p. 506. † Ibid. p. 506, 507. ‡ Ibid. p. 508.

But were it otherwiſe, is the effect of *coloring ſilver* to be aſcribed to any thing but the *phlogiſton?* For if not onely your *ideal*, but even *real ſulphur* were diveſted of it's *phlogiſton*, is it not well known, that it's *acid baſis* will *not tinge* ſilver *yellow*, nor quickſilver *black?* And yet does not every ſubject, in which this *phlogiſton* is ſet at liberty, produce the ſame effects on metals and their ſolutions, as *ſulphur* does?

Do you not injuriouſly charge the inoffenſive *Caeſalpinus* with a ſtrange blunder, in making *ſilver* yield a *blue ruſt* with acids *? Is not this *your own?* *Analyſis*, p. 78, 79.

After ſome obſervations on your experiments with *your artificial ſulphureous* waters, you come to apply them to your experiments on the *natural waters*, which you call *ſulphureous*. Do you not tell us †, that the *fixed alcalies* do not cauſe a *precipitation* in the *ſulphureous waters*, as a ſalt of that nature, the *natron* abounds in them? If this were true, how comes it that in moſt of the *ſulphureous* waters you inſtance, an *alcali* actually cauſes a *precipitation* of earth? Is it not becauſe an acid held the earth diſſolved? And can an *acid* and *actual ſulphur* ſubſiſt in the ſame ſolution? Should not this teach you that *your ſulphureous* waters bear *no analogy* to your *artificial ſolution* of *ſulphur?* Analyſis, p. 79, 80.

Do you not, to bring your experiments to your *theory*, tell us ‡, that *Moffat*, *Swadlingbar*, and others of *your ſulphureous* waters grow alike *white* with *alcalies* and with *acids?* Can this be poſſibly true by any rules of theory or practice?

After enumerating, and trying your experiments upon the ſeveral ſulphureous waters, which you muſt now confeſs are *not ſolutions* of brimſtone by *alcalies*, as you have aſſerted; do you not with like confidence aſſert, that *beſides ſome of theſe waters, which yield ſulphur in ſubſtance, the reſiduum of theſe waters*

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* Ibid. p. 511.

† Ibid. p. 511.

‡ Ibid. p. 517.

waters in general, whether obtained by ſpontaneous precipitation or evaporation, is either inflammable, or at leſt, ſparkles and ſtinks on the red hot iron, and ſometimes burns with a blew flame? Sure this could not happen, were the *ſulphur diſſolved* by means of an *alcali?* for then, the combuſtible parts would have flown off, leaving the incombuſtible, neuter ſalt behind? Is the reſidue of *Aken* water a *ſulphureous combuſtible?* Have you not learned, and from whom, that it is not? Yet do you perſiſt in your error! But in ſome, you have your old, fortunate ſubterfuge: the *reſidue*, on a *red hod iron*, *ſmokes*, *crackles*, *ſparkles* and *ſtinks*. And this is your *ubiquitarian ſulphur! Analyſis*, p. 80, 81.

Do you not inſtance *Nottingham* water, as one of *your ſulphureo-nitrous?* Yet, in your experiments, do you not *omit* proving upon your own preceding plan, *the two denominating ingredients*, *ſulphur* and *nitre?*

Do you not * ſay, that *Fonſanche* and *Swadlingbar* waters may be imitated by *boiling ſulphur* in *lime water?* Yet do you give a ſingle proof of this by experiment? Do you not yourſelf demonſtrate the reverſe? *Analyſis*, p. 83.

Is not your claſs of *ſulphureo-chalybeate* waters 'nvolved in perplexing doubts, obſcurities and uncertainties? Does it ſhew any other than a *putrid chalybeate* water, ſuch as you often have in an ill corked bottle of *Spa* or *Pyrmont* waters! *Analyſis*, p. 84. Or ſuch as you are hereafter ſhewn, Bath waters putrified prove?

Is not your diſtinction of natural baths into *domeſtic hot and warm*, a little inexpreſſive and confuſed? *Analyſis*, p. 85.

Have you not taken the worſt information and drawn the falſeſt inferences from the worſt experiments on Bath waters †? And are not theſe contradicted by uncontroverted experiments and obſervations in the *Eſſay* on waters? Yet have you not purpoſely rejected and oppoſed theſe, to embrace thoſe? *Analyſis*, p. 86, 87, 88, 89. Which does this ariſe from ignorance or perverſeneſs?

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* Ibid. p. 521.

† Ibid. p, 595.

Do you not join with one celebrated writer, who founds the virtues of Bath waters upon their *ſulphureous* and *ſaponaceous* qualities? And are you not now convinced, and by whom, that theſe waters are the diametrical *reverſe* of *ſulphureous* and *ſopy*? *Analyſis*, p. 89, 90.

Are you not pleaſed to call the Baths of Aken *foregne*, in contradiſtinction to thoſe of Bath, which you are pleaſed to call *domeſtic*? Are not theſe that are contained in houſes, more properly and in the phyſical ſenſe, *domeſtic*, than thoſe that are in no houſes, and have no covering, but the canopy of Heaven?

Do you not give *Aken waters* the firſt claſs among *ſulphureous*? And do they not fall ſhort of moſt, if not of all, of your *teſts* of *ſulphureous*, which you look upon to be *onely ſolutions* of ſulphur in the *mineral alcali*? Has not this water been evidently proved to you, to be impregnated in another manner, upon quite different principles? And do you receive or refute the doctrine? *Analyſis*, p. 92. Do you not, in your *argument*, attempt to retort this notion of their impregnation on me?

Do you not aſſert *, that *though the emperor's bath yields flowers of ſulphur in it's vault, it is ſweet and fit to drink*? Yet are you not convinced, that it is reckoned by many to *taſte* of *rotten eggs*? or to be more preciſe and clear, that it has a *ſaline, ſomewhat bitter* and *lixivial taſte*? Is it not alſo proved to be *too hot* to be *fit to drink*? And is it from hence, you are pleaſed to pronounce it, againſt common conſent, *ſweet* and *fit to drink*? *Analyſis*, p. 93, 94.

Does not every experiment you give on theſe waters, ſhew the falſehood and falacy of your looking upon them as *impregnated* with a *ſolution* of ſulphur;

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* Ibid. p. 626.

by means of an *alcali?* Does it not overthrow your *whole ſyſtem* of *ſulphureous waters?* Since this, though confeſſedly the ſtrongeſt impregnation known, ſuffers *no precipitation* with *acids*, and ſuffers *a precipitation* with *alcalies*, which cannot be ſayed of *your ſolutions* of ſulphur.

Do you not ſay, that the *ſolutions* of *lead* and *ſilver* produce the ſame effects with *alcalies*, cauſe a *milkineſs*, in theſe waters? And is not the falſehood of this aſſertion made manifeſt to you, and by whom, and that thoſe *ſolutions* cauſe *diſcolored*, or *brown*, inſtead of *white*, precipitations in theſe waters? *Analyſis*, p. 94.

Did not your miſtakes in theſe ſpurious experiments induce you to think theſe waters, a weaker impregnation of ſulphur, than *your ſulphureous waters*, till you found they gave you as full proof of ſulphur, as is found in the *roſte yelk* of an egg?

Do you not aſſert, that *it is a doubt whether or not theſe waters are moved to any abullition by acids?* Yet have you not been convinced, and by whom, that *all*, even the *ſlighteſt*, *acids* cauſe an *abullition* in theſe waters; but *no precipitation*, which they muſt have done, had the impregnation been upon your plan, *a ſolution of ſulphur* by a fixed *alcali? Analyſis*, p. 95.

Do you not ſay, *the ſalt of this water is not a pure alcali?* wonderful! when you are convinced it contains *two kinds* of ſalt, the *muriatic* and *alcaline! Analyſis*, p. 95.

Is it not very extraordinary, that, though theſe waters afford but *one*, and that the moſt doubtful and imperfect of *your teſts* of *ſulphureous waters*; though by your own confeſſion, they are *not alcaline*, and *ſuffer a precipitation* by ſtanding, and by *alcalies*, and undergo *an ebullition* upon mixture with all *acids*, *without any* degree or kind of *precipitation*, rather the reverſe; yet unfortunately for *your whole ſulphureous ſyſtem*, you find *that large quantities of the moſt pure,* *true flowers of ſulphur are collected on the vaults and walls of the baths, where they are ſublimed by a ſubterraneous heat?* Now, have you not had unconteſted evidence, that *this ſulphur* was collected *onely on the vaults* of particular ſources, *not on the walls* of any of the baths? Is not the *impoſſibility* of its being a *ſublimation* experimentally *proved?* — Has it not been ſhewn to be a *generation*, not a ſublimation of ſulphur, the elements of which are manifeſted in the vapor? Yet have you received, or upon conviction, rejected this upon better evidence? *Analyſis*, p. 96. But to procede;

Do you not ſay, *the diſtilled* Aken *water* is *ſweet?* Has it not been expreſsly ſhewn by experiments to be the *reverſe* of ſweet, in every ſenſe of the word? *Analyſis*, p. 97.

Do you come nearer aſcertaining the proportion of the ſalts, than calling it a *fourth* or *fifth* part of the ſolid contents? And do you determine the nature of the ſalt further than by ſaying, it is *partly alcaline, partly neuter?* Is it of no conſequence to determine the *quantity* and the *kind* of *alcali* and the *kind* of *neuter ſalts?* And has not all this been accurately layed before you, to no purpoſe? Has it not been ſhewn, that the *ſolid contents* are near *three times* as much as you are pleaſed to make them. *Analyſis*, p. 97, 98.

Is not your *practice* of a piece with your *chemical knowledge* and accuracy? Is not your poſition worthy of yourſelf, when you ſay, *they corroborate in relaxations, and relax in contractions, as is obſerved of our Bath waters?* Is not the internal uſe much of a piece, when you tell us, *they warm or heat the cold, and cool or attemperate the hot?* Are you not now ſenſible of theſe and many ſuch like groſs contradictions in ſenſe and terms? And do you not run into the like contradictions and confuſions in treating of the Baths of *Baden* and others? *Analyſis*, p. 98, 99. Are you not now convinced, and by whom, that the waters of Aken and Bath are in all reſpects, the diametrical reverſe of each other?

Now, Sir, before I attend to your laſt learned production, *the argument of ſulphur or no ſulphur in waters diſcuſſed*; have I not ſome right to expect for the public's ſake, if not for my private ſatisfaction, that you will either acknowledge and receive theſe corrections of your manifold errors, or that you will ſhew, that the errors are on my ſide?

After this, ſurely, I may be indulged with the ſame diſquiſition you make in the preface, by way of objection; *whether or not the author be worthy of the ſerious confutation here beſtowed upon him?* Though you hardly underſtand a ſingle line of the *Eſſay* on waters, or perhaps deſignedly miſinterpret or pervert every ſentence; though you appear more ignorant, incorrect and erroneous than any author I ever read on theſe like ſubjects; yet I think it right and my duty, however unworthy you may be found of my notice otherwiſe, to ſet you to rights, or the public, with reſpect to you, or to acknowledge any correction you or your *junto* may poſſibly make in my writings: For, to retract an error or a falſhood, and to maintain a truth, with me, are one and the ſame.

To avoid miſtakes and miſrepreſentations, I have every where taken care to define and critically to characteriſe the ſubjects of which I treat in the *Eſſay* on waters. Therefore, whenever you loſe ſight of what I lay down, in this controverſy, you deceive your reader and do me injuſtice. Yet with this are you chargeable in every part of *your argument.*

You are pleaſed in p. 1, 2. to inſinuate, that I confound the *phlogiſton*, *ſulphur*, and the *oily matter*, or that the diſtinction of theſe tends to darken, rather than inlighten the ſubject.

It is indeed hard to ſay which you would be at. I have taken uncommon pains to make you ſenſible of your profound ignorance of the *principles*, as well as of the *rules* of *chemiſtry*, with the pure intent to induce you to ſet about obtaining the wanted information. Yet here, you ſhew your ſelf deaf to all reproach, averſe to all reformation!

You begin with giving a ſketch of my definition of the phlogiſton. And becauſe I point out the ſubjects in which it is found; you think you may confound the moſt ſimple, ſubtil eſſence, one of the *elements or principles of bodies*, with the *groſs bodies*, in a combination with which alone, it becomes an object of ſenſe!

Thus in your curious table, p. 2. You give confuſed ſketches of what I curſorily ſay of the *phlogiſton*, of *ſulphur* and of the *oily matter*; with reſpect to the firſt, from enumerating its effects and properties, which takes me up little leſs than five pages *; you artfully take a fragment, without regard to the context, to ſerve your purpoſe; viz. *gives a diſagreeable ſtench.* Next, as to ſulphur, it ſeems, I ſay, that this alſo *has a diſagreeable ſtench*, when *its ſolution by alcalies is precipitated by acids.* And thirdly, it is found that I ſome where ſay, that the *oily matter emits a diſagreeable ſtench in putrid waters, like that of a ſolution of ſulphur precipitated by alcalies.*

Now, becauſe of this pretended analogyand the like, in the ſucceding table,you judge that I am ſo far from diſtinguiſhing theſe three ſubjects, that I confound them together. *Argum*. p. 3.

Pray, learned Doctor, where is the *analogy?* Who confounds *principles* with *mixt* or *compound bodies*, You or I? or who does not diſtinguiſh that in each of theſe articles, it is the *eſcaping inflammable principle* in the precipitating *ſulphur*, and in the *putrid oily matter*, not the *mixts* or *compounds*, that are not onely *analagous*, but truly *one and the ſame?* Is not this the caſe in the ſubſequent articles in your table? No. 2. *Phlogiſton tarniſhes ſilver yellow and black.* The ſolutions

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* Essay, P. I. §. 12. 2. P. II, §46. 4. to §. 50.

of ſulphur in alcalies and the vapors from their precipitation by acids have a ſimilar effect. And *putrid waters do the ſame.*

Good Sir, is it not the *eſcaping phlogiſton* from *ſulphur* and the *oily matter*, that produces the ſame effect with the pure *elementary phlogiſton?*

And does not this hold true alſo of the following numbers 3, 4, and 5; except where you are forced to confeſs, No. 4, that *ſulphur* has not the effect of either the *phlogiſton* or the *oily matter*.

Does *ſulphur* in the *mixt body*, or the *oily matter*, in the natural ſtate, produce any effect, except burning, analogous to the *phlogiſtic principle?* Is it not by ſetting this *principle* in motion, by ſome degree of heat, or in alcaline ſolutions of ſulphur, and in the *putrifaction* of the *oily matter* in waters, that *theſe mixts* bear any analogy in effects to the *pure phlogiſtic principle?*

If you doubt this, leave the *phlogiſton* motionleſs in the *ſulphur*, or in the *oily matter* in water in the natural ſtate; ſee then what effects of the *phlogiſton* they will ſhew upon any trial. Or if this be not ſatisfactory, deprive the *ſulphur* of it's *phlogiſton* by burning, which will leave it's acid behind, or by evaporating the ſolution of ſulphur in a fixed alcali, which will give a neuter ſalt from the union of the acid with the *alcali*, and the putrid water by boiling or expoſing it to the open air; and if you be not determined further to harden your ſelf againſt the conviction of truth and reaſon, you muſt ſee that neither, when ſpoiled of the inflammable principle, have any of the effects of *ſmelling ſtrong*, *tarniſhing metals* and the like, which muſt therefore be, in *all*, to be aſcribed to the *phlogiſton onely*.

But, you chooſe to be confident, that I confound the *phlogiſton* and the *oily matter*, when I ſay, *ſuch waters as contain the* phlogiſton, *loſe it on being heated; but the* oily matter *may be found with the reſiduum after evaporation.*

evaporation. Why do you not take in the context where I ſhew, that this *principle* and this *mixt body* are often confounded together, but moſt injudiciouſly, as they are as different as a ſimple elementary matter and a mixed or compound body can be, and then point out the above among other methods of diſtinguiſhing the one from the other ? You do not chooſe to carry with you, even the immediately preceding paragraph, from which, what you cite can not be ſeparated, without deſigned violence and the wilful perverſion, that ſeem inſeparable from Doctor RUTTY and his *junto.* The paragraph runs thus, *the* one, to wit, the inflammable principle, *is onely to be demonſtrated in it's effects or union with other bodies* ; *the* other, to wit, the oily matter, *may, by various means, be ſhewn in an aggregate form.* Then follows your quotation, *ſuch waters, for example*, &c.

Now, whether your exultation upon this, to you ſeeming, falſehood, ariſes from ignorance or perverſeneſs, let thoſe who know you beſt determine. You leave the determination to the ſequel at large, which ſhould be brought here, and content yourſelf with ſaying, *we find many undeniable inſtances of the phlogiſton being retained in the* reſiduum, *after the evaporation of the aqueous humidity, and ſo we are left equally bewildered as before.*

See here, good Doctor, a ſtrong ſpecimen of your regard to truth and common ſenſe! That the *phlogiſton* remanes in many waters, even in your curious mineral water, *cow's piſs*, after evaporation, is true; ſo it does in charcoal after the longeſt cloſe calcination. In the former, it is a part of the *undecompoſed oily matter*, in the later, it adheres to the other terrene principles. But you and your *junto* are challenged to ſhew an inſtance where the *pure phlogiſton*, or that ariſing from *decompoſed bodies*, or *putrified waters*, is found to remane after evaporation by fire. And thus you go on, every where confounding ſimple, ſubtil, inviſible, elementary, primary particles or principles of bodies, with mixt or compound, groſs bodies, objects of ſight and other ſenſes!

Men ſhould not argue till they have agreed upon principles and definitions; but you obſtinately diſdain to be confined to either. See then, the difficulty under which I labor, when I am forced to teach you, before I can hope to convince you. Look over the definition and deſcription of the *oily matter*, ſet forth in the *Eſſay* on waters, P. III. p. 278, § 135, and others here referred to, and ſee what right you can have to ſwerve from theſe definitions and deſcriptions, in a controverſy with the author. But what I have already ſayed might anſwer for all the reſt: You miſtake, miſunderſtand or pervert my words and meaning every where. Let this however ſuffice for your 1, 2, 3 and 4 pages, and ſo on till we come to the later end of the 4th and beginning of the 5th pages, where, after a charge of an *affected fondneſs for the above* greek word, which is ſayed *to have betrayed the* author *into an utter neglect of the evidence of common ſenſe*.

Had your reading, my learned Friend, exceded *Turner*, *Short*, *Shaw*, *Threlkeld*, *Charlton*, and a few more of the like claſs, You muſt have known that *phlogiſton* is a received technical word, with BECHER, STAHL and all the beſt modern writers in chemiſtry, to expreſs the *inflammable principle* of bodies. But you are a genius above being confined to principles of any denomination or kind.

To ſhew how this word *betrayed me to an utter neglect of the evidence of common ſenſe*, you are pleaſed to aſk, *for, where is the alcali to let looſe the* phlogiſton, *in an ointment of brimſtone and butter ſo offenſive to delicate ladies in the cure of the itch?* Who will deny your having as juſt an idea of *delicate ladies*, who have the itch, and uſe an ointment of brimſtone and butter, as of *principles?* To inforce this unanſwerable

able argument, you inſtance the color given quickſilver by trituration with brimſtone, and to a ſilver ſpoon upon being dipped in melting brimſtone.

Though, I think, I have anſwered theſe before, I ſhall ſpeak a word more to them, becauſe your memory is as dull as your conception is groſs and crude. 1. It is peculiar to the *mixt*, called brimſtone, to give an offenſive ſmell upon friction in general, but eſpecially upon being rubbed into the pores of animal bodies; becauſe the vital heat diſſipates a portion of the *phlogiſton*, if not of the intire *mixt*. 2. It blackens quickſilver upon being rubbed with it; the heat of friction facilitating the union, and the *phlogiſton* tinging. And 3. if fuſed, it's parts, the more volatile eſpecially, are put ſo much in motion, that the metals, called mercurial, are tarniſhed upon approach or contact, by the *phlogiſton*. As proof, deprive *ſulphur* of it's *phlogiſton*, it's *acid baſe* will give *no ſort of ſmell*, will change *quickſilver* to a *yellow*, *not a black*, and will *not tarniſh* a ſilver ſpoon. I know you will ſtare at this. But ſee if you can not get one of your *junto* to explane it. I do not then, Miſtaken Friend, *mean to deſtroy the obvious marks of ſulphur*, as you are pleaſed to charge; I labor to inveſtigate it's characteriſtics and qualities, and to diſtinguiſh it properly from one of it's *conſtituents parts*, from the *oily matter* in waters, from the *ſulphur of fools* and pretenders to chemiſtry, *all combuſtible matters*, or all things, which *on a red hot iron, fume, ſparkle, burn or ſtink.*

As a proof of this, and to tye down irregulars, as far as may be, to rules; I here inſert the criterion of ſulphur agreed upon by all the regular writers in chemiſtry, as I have layed them down in mine *Eſſay* on waters, P. III. p. 33, 34, 35.

“ § 78. To remove all room for doubt, and to avoid that ambiguity, into which, moſt writers on medicated waters run; I here ſet down what chemiſts and naturaliſts underſtand by ſulphur, and what I mean, wherever I uſe the word."

"§ 79. Sulphur is a mineral concrete of a peculiar ſmell; to taſte, almoſt inſipid. When pure and ſimple, always of a pale yellow; but changing into various ſhades of this and other colors, upon combination with different minerals and metallics. In the concrete form, it is not quite opac; it is harder than reſin, more compact and heavy; but breaks in ſtriae, like little packets of cryſtalliſed ſalts. The more ſubtilly it is divided, the more coloreſs and white it appears. Thus it's magiſtery, made by diſſolving it in water, by the means of alcalies, and precipitating it with acids, is of a pale white. It requires an heat ſome degrees above that of boiling water to melt it, when melted, it appears a tranſparent liquor of a rediſh color; but, upon cooling, changes to it's priſtine pale yellow color, and becomes opac again. Upon breaking the concrete, it ſhews itſelf compoſed of little bundles of ſhining needles, like cryſtalliſed ſalts. While it fuſes, a ſubtil vapor conſtantly flies off, which is offenſive to the noſe and lungs. This vapor collected in any fit veſſel, condenſes in form of a mealy powder, called, flowers of ſulphur; theſe are compoſed of minute cryſtals of the ſulphur, whoſe color and qualities, it poſſeſſes. The whole of the ſulphur ſublimes in this form, in which, it ſuffers no change, but comminution; for, by fuſion it is reduced to it's original form and conſiſtency. It is extremely inflammable, ſo as to catch fire from a ſpark, whence it makes a principle part in the compoſition of gunpowder. Being ſet on fire, it burns ſlowly and calmly; gives a blew flame without any ſoot or ſmoke; but, a white vapour flies off as it burns, which offends the eyes and noſe and is intolerable to the lungs. It is hard to extinguiſh the flames of ſulphur, when it is once ſet on fire. It's vapors or fumes being collected in fit glaſſes, condenſe into an heavy acid liquor, with all the properties of that found in alum, vitriol, &c. This ſhews the conſtituent parts of ſulphur to be the univerſal acid and the inflammable principle, and the proportions are found to be about fifteen parts of the acid to one of the phlogiſton. That ſulphur conſiſts of theſe parts, is alſo proved by the artificial generation of ſulphur, which is produced by fuſing any neuter ſalt, compoſed of the vitriolic acid, and throwing into it, any inflammable body, the reſult of which will be a dark colored maſs, which partly diſſolves in water; gives a fetid ſmell and a yellow tincture, which is precipitated by acids, in the form of a magiſtery, which, fuſed, gives perfect ſulphur."

"§ 80. Sulphur is ſoluble in oils, by the motion of heat; eaſily and in larger quantities in the liquid bitumens or mineral oils, and in the more groſs and viſcid, the expreſſed vegetable oils; more hardly and in leſs quantity, in the more light and ſubtil, the eſſential or diſtilled oils; to all which, it gives a dark red color and thick conſiſtence, in proportion to the degree of impregnation,"

"§ 81. Sulphur is not ſoluble in any acid,
in burning ſpirits, or
in water."

"§ 82. Sulphur unites with all metals and ſemimetals by fuſion; with this they are generally found mineraliſed; except gold."

"§ 83. Sulphur, with two parts of a fixed alcali, fuſes into a liver-colored, fetid maſs, which is capable of diſſolving all the metals, gold not excepted. This maſs, which is called liver of ſulphur, 1. runs or liquefies in the air, is of a muddy dark color and nauſeous ſmell and taſte. 2. It diſſolves in alcohol, and gives an orange-colored tincture. 3. It diſſolves in water and gives it an high yellow color. 4. If acids be added, theſe ſolutions are deſtroyed; they grow firſt milky and more fetid, and as faſt as the alcali is ſaturated, the ſulphur is precipitated in the form of a white magiſtery; which, being waſhed with fair water and dried, gives the preparation of this mineral, called milk, magiſtery, or precipitate of ſulphur. It is but ſulphur in a more ſubtil ſtate of diviſion: For, by fuſion it is reſtored to it's priſtine form and conſiſtency."

"§ 84. Sulphur alſo diſſolves by boiling in alcaline leys or lime water; and by acids, the ſolution is deſtroyed, and the ſame precipitations as above produced."

"§ 85. Sulphur being mixed with ſalt ammoniac and quick lime, by diſtillation yields a very pungent, fetid liquor, of an high red color, which fumes perpetually. This liquor or it's fumes turn ſolutions of lead, black. And ſaturated with acids, it yields a precipitate of ſulphur."

"§ 86. Theſe ſeveral ſolutions of ſulphur tinge ſilver firſt yellow, or of a gold color, and ſoon after, tarniſh it red, blew, purple and black. Their vapors produce the ſame effect, but more ſlowly. And water, with ſuch impregnated, precipitates the ſolutions of the mercurial or white metals, in different ſhades of yellow or brown, according to the degree and ſubtility of the impregnation."

"§ 87. Theſe are ſome of the principle diſtinguiſhing characteriſtics and properties of ſulphur, which in our language is called brimſtone; and no ſubſtance, in which theſe do not agree and meet, is to be deemed or called ſulphur, without falſhood and confuſion."

Now, Sir, this was written and publiſhed, and got into your hands before you gave the longing world your *methodical ſynopſis of mineral waters.* If the doctrine be true and uſeful, why not adopt it? If falſe, why not, for the ſake of truth and the public, for your own ſake, refute it? Would not this have ſaved you much confuſion and incoherency, many a trip and ſtumble? And does it not now ſtand a bar to all and every thing you ſay of *your ſulphur* and *ſulphureous waters?* Can you have any right to ſwerve from this definition, though it were imperfect, in a controverſy with him who layed it down? eſpecially, ſince you are pleaſed to make the following conceſſion on your 3d. p. *But to do him juſtice, it muſt be confeſſed he has taken care elſewhere, to lay down the diſtinguiſhing marks of ſulphur and it's hepar*; with *your ſalvo, but it is alſo obſervable, that* moſt of theſe marks *are actually found in the waters called ſulphureous, or in their natural products, as ſhall be exemplified in the ſequel.*

Well, this is to be proved: I have not yet found that it is. We ſhall ſee, as we have already ſeen, that among *all his ſulphureous waters* in his *ſynopſis,* he is not able to ſhow *one,* in which *moſt of the marks of ſulphur* are found. But, would it ſatisfy you, that *moſt* of theſe *marks* were diſcovered? This can not conclude me, unleſs *all the marks* are evidently demonſtrated. Here we differ, and here probably we ſhall differ on to eternity. But take notice that you can have no right, in this diſpute to call any thing after this, the *Phlogiſton, ſulphur,* or the *oily matter,* but ſuch as anſwer to my definitions and deſcriptions.

You tell us, p. 5. that *our author however procedes without reſerve or ſubterfuge, not to ſay without caution,* (I wiſh you had ſayed, cunning) *to aſſert, that the fetid ſmell and tarniſhing ſilver in putrifying waters* (*to which he compares thoſe called ſulphureous*) *is owing to the Phlogiſton, and not onely ſo, but to Phlogiſton alone.*"

This, by the bye, is proved throughout the *Eſſay* on waters, particularly in the parts you chooſe to cite by inconnected fragments. It is alſo proved in the preceding part of this letter; where it is obſerved that the pure *Phlogiſton,* and that eſcaping from ſolutions of ſulphur and from putrid waters, produce, in numberleſs inſtances, ſimilar effects; whereas ſulphur and putrid waters, deprived of this principle, produce no ſuch effect.

But theſe are nothing, to you, who find "that *the putrid waters do not conſiſt of the* Phlogiſton alone, *but contain alſo a* volatile, alcaline ſpirit and ſalt, *to a combination of which, with the* Phlogiſton, *the effects mentioned are to be aſcribed.*"

Admirable Doctor! where do you find *volatile alcali* without the *Phlogiſton?* Learn the conſtituent parts of this ſalt, before you preſume to treat of it. And you will find the *Phlogiſton* often without a *volatile alcali*; but *no volatile alcali* without *Phlogiſton.* Then, while your hand is in, learn *ſomething* of *fermentation* and *putrifaction:* Then may you know, that as the *firſt fermentation* is *vinoſe*, the *ſecond acetoſe*, ſo is the *firſt* ſtage of *putrifaction aceſcent*, the *ſecond alcaleſcent.* When you have acquired a little tincture of knowledge in theſe operations, in nature and in art, you will find that few mineral waters are yet known, that are ever carried to the laſt, the *alcaleſcent ſtage* of *putrifaction.*

After all that you have ſeen touching the *moſt ſimple, ſubtil eſſences*, called *principles*, in the controverted work, what are we to think of you, when, p. 5. you deſire *the Phlogiſton may be examined in a ſtate of ſimplicity, or in ſuch a form where it makes the neareſt approach thereto?* How often have you been informed, that *principles* are too minute to be objects of ſenſe, and that they are diſcoverable onely by their combinations and effects: But you want to find them *viſible* and palpable! And ſo you give us inflammable exhalations, perhaps vapors of petroleum or ſome other fine bitumen, as the *inflammable principle*, or as you call it, *a notable ſpecies of Phlogiſton*, p. 7.

Are you not aſhamed that you can not be kept within any rules or bound by any *principles*, in any ſenſe of the word? *A notable ſpecies of Phlogiſton!* Is a moſt *ſimple*, *ſubtil*, *invariable eſſence*, which is found *one and the ſame* in every ſubject of the creation, to be divided into *ſpecies?* It ſeems it muſt, to adapt it to groſs capacities! After this, who can hold an argument with Doctor *Rutty*, thus uniformly conſiſtent with himſelf, in inconſiſtencies?

But, you go on in the ſame page, and call a ſubtil combuſtible vapor, *this Phlogiſton.* And add, "that contrary to the Author's theory, it is not eſſential to the water on which *this Phlogiſton* flotes to tinge ſilver." Does the combuſtible vapor tinge ſilver? you have not learned. To clear your ideas, throw any ſubtil oil or vinous ſpirit upon any water; heat the water and it will emit a combuſtible vapor, that will take fire from any flame and burn. Is this the *Phlogiſton?* It is *your ſpecies of Phlogiſton.* Compare it to a pure principle if you can. Of a piece with this are your unmeaning experiments on an other of *your Phlogiſtons*, Froebenius's *Æther*, and your inferences and concluſions ſhew, that you know no more of that fluid, than you do of *your notable ſpecies* of the *Phlogiſton*, and quite agreeable to your groſs and crude conceptions of the elements or principles of bodies. Had you but learned a rational idea of the compoſition of *Æther*, or of the etiology of the proceſs, you muſt have known, that this fluid, however light and ſubtil, is no more a *ſimple eſſence*, a *principle*, the *Phlogiſton*, than *brimſtone*, *petroleum*, *oil* or *fat*. Let this ſtop your blundering, till you learn ſomething of the ſubject, of which you treat with temerity and ſelf-ſufficiency, hardly to be paralleled or pardoned.

Can you now reaſonably expect, that I ſhall purſue you further through the mazes in which you are bewildered in *your argument?* It is an hard and a diſagreeable taſk: It is hard, becauſe you pay no regard to truth, know no principles, and obſerve no regular method. Yet as it would be cruel to leave you and your *junto*, vaunting in your imaginary conqueſts, I think it right, for the ſake of thoſe whom you may miſlead, to expoſe *your argument* a little further.

You are pleaſed to begin your conſideration of the *objections to the exiſtence of ſulphur in waters*, in your uſual manner, with citations of disjointed, fractured paragraphs.

You are not pleaſed to take it into conſideration, that all the writers on mineral waters, from whom you borrow all that your maſſive volume contains, all look upon what they and you call *ſulphureous waters*, as *impregnated* with *ſulphur* by the *means* commonly known in art, by *ſolution with fixed alcalies.* You go on in the ſame ſtrain, and give the ſeveral examples of artificial ſolutions of ſulphur in waters, as the onely means of accounting for ſuch impregnations in nature. You will not vouchſafe to reflect, that I judged it right and neceſſary to confute the errors of thoſe authors, which you have ſince blindly copied, as I found, that the moſt ſulphureous water yet diſcovered, that of *Aken*, was by no means impregnated in the manner that ſuch authors and ſucceeding plagiaries have ſince contended.

Regardleſs of all theſe conſiderations, to which a proper ſenſe of reaſon and truth would not have ſuffered you to be inattentive, you quote a broken paragraph, to inable you the better to ſuppreſs or to pervert both reaſon and truth. Let us ſee how fairly you repreſent the ſenſe of the author you ſo ſtrenuouſly, I might have ſayed, virulently oppoſe. Your ſecond ſection begins thus, "The firſt objection is, that although they, and particularly the *Aken* waters, agree to a ſulphureous impregnation by their ſmell and ſome other effects, yet they are abſolutely colorleſs, *whereas a much ſmaller portion of actual* ſulphur *than appears to be in theſe waters, would give a ſenſible yellow color to a much larger quantity of water.* And for this, you are pleaſed to quote the *Eſſay* on waters, P. III, p. 69, where the mangled and miſunderſtood paragraph ſtands thus ; " A much ſmaller portion of actual ſulphur, than appears to be in theſe waters, by their ſmell and other effects mentioned, by any *known means of art*, diſſolved in them, would give a ſenſible yellow color to a larger quantity of water. But, theſe thermal waters are abſolutely colorleſs, as the ſimpleſt water known. They may then, in mine apprehenſion, contain a greater proportion of the principles of ſulphur, but not of actual ſulphur, without change of color. Here then, is no change of color, conſequently, theſe waters are not to be looked upon as a ſolution of ſulphur, or to contain actual or ſubſtantial ſulphur." Then to this, the ſubſequent paragraph is ſo connected in ſenſe and meaning, that without running into your wonted mutilations, I cannot omit copying it here : Thus it runs ; " If theſe waters were ſuch a ſolution of ſulphur, an alcali muſt be predominant in them, and acids would cauſe a precipitation. But, the volatile acid is evidently contained, though not actually predominant, in them ; as appears by various experiments, § 183 to § 188. Then all the mineral acids, inſtead of cauſing any precipitation, as they muſt do in all the ſolutions of ſulphur, increaſe and preſerve the pellucidity of theſe waters, § 257. to 269. Conſequently, they are not ſubſtantially though they be eſſentially, impregnated with ſulphur. Which contradicts a received canon, that waters ſmelling like putrid eggs, are ſulphureous, by which the aſſerters of it, if any thing, mean an actual ſolution of ſulphur".

Now, this is the objection, which you did not chooſe to ſtate in it's full light and force, from your apparent modeſty and averſion to doing your antagoniſt or the public, common juſtice. This you are pleaſed to call *unphiloſophical*, and that which *ſhews an utter inattention to the extreme diviſibility of matter*, and *a ſuppoſition that artificial ſolutions are as perfect as thoſe performed by nature*, &c. p. 9. *And* were you but inclined to condeſcend to the dull and groſs *conceptions* *of our author,* (*a certain late Adept*) in *theſe matters, as if color was an eſſential mark of ſulphur in waters, you could ſwell your book with various accounts of waters of this ſort,* &c. p. 10.

Let me beg leave to ſtop your rapid carreer but for a moment, my Learned Antagoniſt, to aſk you, whoſe method of accounting for the ſubtil impregnation of theſe waters is the *moſt unphiloſophical?* Yours, who never, till now, pretended to account for it otherwiſe than by groſs corporeal, artificial ſolution? Or mine, who endeavour to explane it by a diffuſion of the ſubtil principles or conſtituent parts of ſulphur throughout the water of *Aken* and colligible from it's vapors? Whoſe conceptions are the moſt *dull and* groſs? and who *ſhews the utter inattention to the diviſibility of matter?* He who deduces the ſubjects of chemiſtry in his *Eſſay* on waters, from their primary particles or principles? Or he who can form no idea of ſuch ſubtil eſſences, and confounds elements with mixts, compounds and aggregates? Let the diſpaſſionate reader judge.

But, by the ingenuity of an Apothecary, to whom you owe the beſt of the little you know of chemiſtry or natural hiſtory, as well as your preſent boaſted diſcovery, and whoſe merit I firſt forced you to confeſs, one who juſtly merits a better place then he now has at the head of your *conclave,* or *clandeſtine junto,* you have ſtumbled upon a proceſs, which if it proved any thing to the purpoſe, would prove ſomewhat too much for you, without ſhaking a ſingle point of the doctrine in my *Eſſay* on waters.

This diſcovery is a *colorleſs* though artificial, *ſolution of* ſulphur, *with all the marks of the natural ſulphureous waters, and from which,* YOU YOURSELF *precipitated a Lac by ſpirit of vitriol.* This curious diſcovery unfortunately was not known to the author of the *Methodical Synopſis of mineral waters,* nor as it ſeems, to any of his quoted *predeceſſors* or *coadjutors.*

But the longing world *is to have it in due ſeaſon.* Have patience, World!

Now, Sir, how much are you overſeen, over-reached, in glancing at this diſcovery here? Does not your Apothecary owe you a grudge, when he thus leaves you deeper in the mire than ever? Why do you ſuffer yourſelf to be thus led by the noſe, by your *Amanuenſis?* For ſhame man! look about you and get out of leading ſtrings, if you be ſure you can ſtand or go alone! Have you not the ſenſe to ſee, that while this notable diſcovery tends to ſtrengthen every material point of doctrine in mine *Eſſay* on waters, it alſo corroberates every poſition againſt your crude notions of ſulphureous waters? This you ſay, *is an artificial ſolution of ſulphur, clear and colorleſs as water,* and therefore would have us believe your natural ſulphureous waters impregnated in the ſame manner. For this purpoſe you muſt produce it, or for none. This is the boaſted *Hercules's* Club, put into your hand by Mr. *Barton*, to knock *Lucas* down. Now ſee whether this *maſſive Club* does not dwindle into a deſpicable diſtaff!

But, my good Doctor, how come you ſo unfortunate as to remind us, that acids precipitate the ſulphur of this ſolution, by which any body but yourſelf muſt ſee that it differs onely in color and degree of impregnation from your own groſs ſolution of ſulphur, for which you quote *Boerhaave?* Does the water of *Aken*, confeſſedly the moſt ſulphureous known, does any of all your long catalogue of ſulphureous waters, even your *aqua florum omnium* ſuffer a precipitation by acids? No; quite the reverſe; all are rendered more clear by acids that contain no coloring matter. None of your ſulphureous waters, not even that of *Aken*, are alcaline, conſequently ſuffer no precipitation by acids. This *happy new diſcovery* the artificial ſulphureous water is alcaline, and therefore ſuffers a precipitation by acids. Has not this the material characteriſtics of the ſolution of liver of ſulphur, all to the color? It was onely to confute ſome of thoſe you copy, that the compariſon of ſuch a ſolution, with the impregnation of *Aken* water has been made in the *Eſſay* on waters. To what then tends this *boaſted diſcovery?* Onely to ſhew that it is *not yellow*, to contradict a certain *late Adept*, though in a ſingle point!

Then permit me, to inform you, great Doctor, without meaning in any wiſe to anticipate your *ingenious Apothecary's* diſcovery, that every ſolution of ſulphur, by fixed or volatile alcalies, in water or in alcohol, even the ſtrongeſt impregnation, in time, eſpecially upon the ſlighteſt admiſſion of air, even ſuch as is found in bottles not filled, though ever ſo cloſely ſtopped, gradually loſes it's color, and lets ſome of the ſulphur precipitate; and at length, grows quite colorleſs and limpid, while it ſtill ſmells ſtrong, and ſtill retains ſulphur enough to admit of a precipitation upon the admixture of acids. Now, give theſe conſiderations their due weight; then thank Puff, or otherwiſe gratify your Apothecary as you will. Let the judicious diſcern, in this, what force he has given to *your argument*, or how he has invalidated mine. But if you remane ſtill ſo thoroughly perſuaded, that *your ſulphureous* waters are impregnated in the ſame manner with Mr. *Barton's ſecret ſolution*; put it to this trial; mix it with any of *your ſulphureous* waters, that of *Bath*, for example; and if you have fairly characteriſed it, a *double decompoſition* muſt attend the mixture of it, with this or any other water, in which an acid predominates, as it confeſſedly does in this. See how *this Club* knocks your antagoniſt down, and ſupports *your argument?*

I hope you ſee, or will from ſome of your *junto* learn, that the principal force of *your argument* has already been exploded. See then what a compliment I pay, in attending you further!

You begin, p. 11. with your ſecond objection and take up two fragments of paragraphs ſo remote as the extreme ends, the *firſt part* and the *third*, of the *Eſſay* on waters. For brevity and eaſe, I will take them as you recite them, and ſhew how little they anſwer your purpoſes.

You ſay, your author lays it down as an axiom, *that ſulphur is not by itſelf ſoluble in water, and can be diſſolved by none other means known, than thoſe of alcaline ſalts or earths.* And that *if* Aken *waters were ſuch a ſolution of* ſulphur *as to contain actual and ſubſtantial* ſulphur, *an alcali muſt be predominant in them, whereas a volatile acid is evidently contained in them, and all the mineral acids, inſtead of cauſing any precipitation, as they muſt do in all ſolutions of* ſulphur, *increaſe and preſerve the pellucidity of theſe waters.*

To refute this, you are pleaſed to ſay, *that the force of this objection reſts on a ſuppoſition, no leſs preſumptuous than this, that for as much as our author knows no other method of impregnating ſulphur with water, that therefore nature itſelf has no other method.* And then you procede to ſhew the falſehood and fallacy of the axiom.

Before I come to your particulars, let me premiſe, that it was to refute ſuch authors as you copy and now weakly ſupport, that theſe axioms as you call them, were layed down, and they reſpect thoſe who, with you, aſſert that what are vulgarly called *ſulphureous waters* are actual *alcaline ſolutions* of ſulphur. *Known method* then, can reſpect onely the methods by them and you layed down. And that the poſitions anſwer theſe purpoſes, you cannot deny; as you muſt confeſs that the powers of the chemiſtry of nature are not once called in queſtion, but every where aſſerted throughout the *Eſſay* on waters. I ſhall leave you to the next edition of *your argument* to correct the phraſe of *impregnating ſulphur with water.* I hope you will in the mean time confeſs, it is not mine.

Your predeceſſors and you are under the neceſſity of proving the reverſe of theſe Poſitions. Let us ſee how you, the champion of ſuch writers, acquit your ſelf and them. You promiſe it indeed. But let us ſee the performance.

You ſay, p. 12, "that *Harrigate* waters and the *Aquae Badenſes* are not impregnated with an alcaline, but marine ſalt. And conclude that ſome other ſolvent than an alcali muſt be admitted for diſſolving the ſulphur with which both theſe waters are eminently impregnated." How does the later part of your poſition appear, that *theſe waters are impregnated with* ſulphur? Not by any experiment, but upon the bare aſſertion of you and ſome of your *worthy predeceſſors!* Any ſalt ſpring or ſea water putrified is, and by your experiments if applied to them, muſt appear, as *eminently impregnated* with ſulphur as theſe. I know your ſubturfuge; you will ſay, as you have done before, *ſea water is impregnated with* ſulphur. And I know not the water that is not in your ſenſe ſulphureous. The firſt part then of your inference, in the ſecond paragraph, p. 12. loſes the weight you would give it.

But what then? You are to overwhelm me in the next and ſucceding paragraphs. Here is a charge of want of candor. Heavy charge! It ſeems to you, that inſtead of aſſerting *that the mineral acids cauſe no precipitation in* Aken *waters, I ſhould have ſayed that acids in general have not this effect*; and this, in hopes to find a contradiction in the change wrought by deſtilled vinegar, you lay hold on, as a drowning rat catches at ſtraws, and ſo diſtort the whole ſeries of experiments, to ſhew the part onely that you think you may wreſt to your purpoſe; which is that *diſtilled vinegar* gives a *milky hue* or *milkineſs*, in *Aken* water, which with ſuch chemiſts as you, ſerve for an *indication* of a *precipitation!* Whether this beſt deſerves the appellation of perverſeneſs or ignorance, or of both, let any unprejudiced perſon judge by the ſequel.

It was ſayed by me, that the *mineral acids* cauſed *no precipitation*, but the *reverſe*, in *Aken* waters. The reaſon is plane to thoſe who know any thing of them; they ſuffer or cauſe no change of color upon mixture with ſimple ſalts and earths. But this cannot be ſayed of the vegetable acids, even the pureſt of the fermented kind, deſtilled vinegar.

Now the experiment with this acid fairly recited ſtands thus, *Eſſay* on waters, part III. p. 89, 90. *Upon dropping twenty drops of* deſtilled vinegar *into an ounce of the water at the ſource, a ſmart ſtrong ebullition aroſe, with a ſeeming milkineſs, upon increaſing to about* 40 *drops, with agitation, it ſeemed ſaturated, when, with a milky hue, it recovered it's original color, that of white wine, or white wine vinegar. After ſtanding* 12 *hours, it appeared full of clouds of a darker color, approaching to a brown, and ſeeming earthy, leaving the ſupernatant fluid pellucid and colorleſs.* And the cauſes of the difference between the effects of this and the mineral acids are explaned, by ſhewing that the pureſt deſtilled vinegar is colored upon the mixture of the fineſt fixed alcali. But all this is purpoſely overlooked, or not underſtood by you; though it be known to every Apothecary who has prepared the diuretic ſalt of the ſhops.

But when you come in the ſame paragraph, p. 13, to anſwer why the mineral acids produce no precipitation, your reaſoning is very curious and inſtructive. Let me give your own words, becauſe I can not match them. *I anſwer,* 1. *by reaſon of the extreme ſubtility and volatility of the* ſulphur, *and* 2. *perhaps by increaſing the pellucidity of this water on another account, even by effecting a more internate ſolution of the terreſtrial matter contained in theſe waters, whereby they become more tranſparent,* &c.

Now the firſt cauſe is falſe; for the more ſubtil the diviſion of the parts of the body diſſolved, and the more volatile, the quicker and finer muſt be the precipitation: Chemiſts, to have their precipitations the more readily and completely made, dilute the ſolution, for a further attenuation of the parts of the body diſſolved. And *Hoffman*'s volatile tincture of ſulphur, which is ſo ſubtil and volatile, that the ſulphureous parts fly off in the cold air, is precipitated by every acid, even that of the air, included with it in a cloſe ſtopped, bottle, partly empty.

And as for the ſecond, how can a chemiſt conceive the ſolution of the earthy matters in a water incomplete, when it is demonſtrated, that the diſſolving acid already abounds in the waters, ſo as to keep the terrene parts diſſolved while they retain their ſolvent, upon the deprivation of which alone, the earthy particules ſeparate and ſubſide, as explaned in the *Eſſay* on waters.

But, not content with your *humorous* triumph upon this refutation of your ill fated author, you come to another argument, p. 13, which if it confutes me, muſt make you more ridiculous than any one would wiſh to ſee one of the profeſſion. In your *ſynopſis*, you inſinuate, you dream of none other method of impregnation of waters, than ſuch as you have taken from the wretched writers that went before you, *your learned predeceſſors*, who all conclude, as you do, *that every ſulphureous water is impregnated with this mineral by means of an alcali onely.* To prove this, you, after their example, recite the ſeveral artificial ſolutions of ſulphur, and ſhew the method of diſcovering and aſcertaining the impregnation, by precipitating the ſulphur by acids. See *your methodical ſynopſis of mineral waters*, under the head of ſulphureous waters, where, by this teſt of precipitation, we are taught to examine waters with acids.

Now, if there be any other method of impregnation, to you, *known*, why did you not lay it down and the method of exploring it? This never entered into your head, till your method was expoſed to deriſion by *my Analyſis* of *your ſynopſis*.

Worthy Sir, if there were any other method then *known* to you, why point out *alcaline ſolutions* as the *onely way* conceived by you or your *junto?* But you are now taught, that this cannot be the way of impregnapregnating any of the waters you call ſulphureous; yet inſtead of declaring a generous conviction, like a lover of truth; you aim only at him, who expoſed your errors, purely for a contradiction of an aſſertion made in oppoſition to your *learned predeceſſors* and you, *that ſulphur cannot, by any other means known,* be actually *or* ſubſtantially *diſſolved in water, than that of alcalies.* Take notice, that if my poſition ſhould be refuted, your theory of ſulphureous waters muſt fall to the ground. Yet how unfortunate are you? for, let my poſition ſtand or fall, your doctrine on theſe ſubjects muſt be ſet at nought, by all competent judges of the controverſy. You glory in the curious diſcovery of your Apothecary, who has found a ſolution of ſulphur, which is colorleſs. This ſecret method then, muſt you judge, be that of nature; and ſo no doubt conclude, *your ſulphureous waters,* thus impregnated. But this, by your own confeſſion, yields ſulphur by precipitation with acids; which cannot be ſayed of one of your ſulphureous waters; and it differs onely in color from the alcaline ſolutions of ſulphur. How then does this ſerve your purpoſe? In what does it refute your antagoniſt?

And now, Sir, p. 14, finding as you are pleaſed to ſay, *that I* reſtrict *the powers both of nature and art, within the narrow bounds of my ſcanty conceptions,* you procede to give us an other diſcovery of a ſolution of ſulphur, and *that without the leaſt aſſiſtance of an alcali.*

The crude experiment, you borrow from your worthy predeceſſor *Chrouet,* one of the meaneſt of the many mean hackney writers on *Aken* waters, corroborated by the repetition of the experiment by a diſtinguiſhed coadjutor of yours, no leſs a perſon than the *profeſſor of chemiſtry in the univerſity of Dublin,* ſhews your refined ideas of ſolution, and how fortunate you are in lighting on irrefragable means of refuting your antagoniſt.

Poor *Chrouet*, as you inform us, " took two iron retorts, into one he put four drachms of ſulphur, into the other, three pints of water, and inſerting the neck of each retort in an hole at each end of an empty barrel, and placing each retort on *the fire*, (not diſtinct fires) at the ſame time, the ſteams uniting in the barrel, and afterwards condenſed, formed a liquor reſembling the waters of *Aken*." This the *profeſſor* has alſo made out, with ſome improvements, and ſome experiments to demonſtrate it a ſolution of ſulphur: In which, he ſo happily ſuccedes, that " the water left at reſt for ſome time, depoſites fair, real flowers of brimſtone."

This is a wonderful proceſs, wonderfully recited, elegantly handled, and perfectly underſtood and explaned! And muſt be confeſſed, while it proves the extent of your knowledge, ſhews *my ſcanty conceptions* of the rules of art and of the laws of nature, in ſolutions!

If this experiment were what you, Learned Gentlemen, ſeem to have thought it, *worthy of being repeated*, why was it not done methodically, regularly, then explaned and proved to be a ſolution? If you do it again, Sirs, permit me to recommend to you, to place a glaſs Aludel or Adaptator tubulated, between the two retorts, with the tube inverted into a fit bottle for a recipient. Place the retorts, not *on the fire*, but in oppoſite convenient ſand furnaces, lute the junctures, and give each retort the proper degree of fire: For, unleſs you can place the *two retorts* on *one fire*, and ſee through ſtaves of wood, this apparatus will be found the beſt to perform the ſtupid proceſs, with propriety. But, it is fit I ſhould advertiſe you, that it will explane the etiology and the product of the proceſs, which cannot anſwer Doctor RUTTY's purpoſe.

For, the fumes of the ſulphur, which would coaleſce in large particules, in a dry recipient, and give common flowers of brimſtone, upon meeting with the vapor of the deſtilling water, is caught and intangled in it, before the particules become large enough to be viſible; and, with this condenſing, give a liquor, which is a lotion of fine, ſubtil flowers of brimſtone. Theſe, being very ſubtil, remane ſuſpended in the liquor, for a while, but, being ſet at reſt, ſubſide.

Now, you triumvirate of chemical ſages, is not this your bungling proceſs, corrected, improved, explaned? Is this *your ſolution, without an alcali? A ſolution emulating Aken waters?* Is this your confutation of *my poſition*, and Doctor RUTTY's *theory* of *ſulphureous waters?* You are forced to confeſs the ſulphur of itſelf ſeparates from this water and ſubſides, when it is left for a while at reſt. If you know any thing, you muſt be ſenſible, that this can not happen to a ſolution, or to pure *Aken* water; and that on the contrary, this neither yields ſulphur by any kind of ſubſidence, precipitation, or evaporation. Where then is the analogy? Go to, and enjoy the exultation of conquerors! So far to *argument*, p. 14, 15.

Here follows a refutation of an objection ſtiled the third. You are pleaſed to ſet out with, *our author however, acquainted with no other method of diſſolving ſulphur but an alcali, procedes upon a ſuppoſition of it's being ſo diſſolved in water, to ſhew that it would be impoſſible to demonſtrate it*, &c. Now Sir, refreſh your memory with a ſight of your own *ſynopſis*, and ſee whether you may or not, with equal propriety, ſet Doctor *Rutty*, inſtead of *our author*, at the head of this ſentence; except the charge of the *impoſſibility of demonſtrating it*; which holds true of neither. And here, agreeable to your uſual ingenuity, you take ſcattered fragments, as moſt likely to ſerve to make out your charge! It muſt be a diſagreeable taſk to me to quote mine own writings; but your unfair quotations lay me under the neceſſity, though it may prove as tedious to ſome readers, as it is irkſom to me. I muſt then here take the liberty of copying the paragraphs, from which you are pleaſed to tear the parts which you mean to refute; and though this may appear tedious, it may help to ſhorten this controverſy, by bringing the matter in conteſt into the faireſt point of light, that in which neither you nor your *junto* chooſe to ſtrike at it. This will be found a fair ſummary of the *true argument* of *ſulphur* or *no ſulphur* in waters, as it is layed down in the *inquiry into the nature and qualities of the waters of Bath*; *Eſſay* on waters, P. III. p. 278, to 280, § 134 to § 137, and p. 316. § 253. which runs thus,

"§ 134. It is certain, all ſolutions of ſulphur in water or watery liquors, which can by no known means be made, but that of lime and alcaline ſalts, either fixed or volatile, all ſuch ſolutions and all impregnations of water, with the eſſential principles of ſulphur, the univerſal acid and *phlogiſton*, will tinge plate ſilver of a golden color firſt, and then to various ſhades of orange, red, blew, purple and black, and precipitale ſolutions of lead and ſilver of a dark yellow brown, or muddy color, inſtead of white, as obſerved of the volatil principles of *Aken* water."

§ 135. But this is not to be attributed to ſulphur or common brimſtone onely; it is owing to the detached or diſengaged phlogiſton or inflammable principle alone, and that of any body, whether of the animal or vegetable, as well as of the mineral kingdom, will always produce the ſame effect. To be more explicit, though prolix: There is no water without more or leſs of an oily ſubſtance. This makes it ſubject to putrifaction, which cauſes a decompoſition of this oily ſubſtance, and ſets the ſubtil phlogiſton at liberty. This makes putrifying waters ſtink and tarniſh ſilver, as is experienced in the bilge waters and others on board ſhips, and wherever ſtrongly putrified water is found. I conceive the air, charged with this ſubtiliſed oily matter; whence vegetables as well as animals inſpire it, and thence become oily or fat. With the air, it mixes with water, by which it is abſorbed and retained, and is probably, one of the principal nutritious matters in water. It is probably this oily ſubſtance chiefly, that putrifies in confined air, where it produces the effects of putrifaction, and cauſes ſome kinds of thoſe vapors, which our miners call damps. The ſeveral bodies of the vegetable and animal kingdoms are ſubject to putrifaction, in which all bodies are reduced to their firſt principles, which being thus diſengaged from each other, act according to the laws of affinity or attraction. Of theſe principles, the inflammable, as the moſt ſubtil and volatil, eſcapes firſt, and among other effects, manifeſts itſelf in the ſmell, ſticks in the pores of ſilver, and gives it a golden color, &c. Before this principle is ſet at liberty, by breaking in ſome ſort it's connection with the univerſal acid in ſulphur, which is effected by the interpoſition of lime and alcalies, or ſuch matters as abſorbe or overcome the acid, with which it is found, in other inſtances, to have the ſtrongeſt attraction or affinity, ſulphur alone is not found to gild ſilver or tinge it yellow; but as ſoon as the union of the acid and the phlogiſton in the ſulphur is broken, and a ſolution of ſulphur is made, by lime or alcalies, then the diſengaged phlogiſton in this, as well as in other bodies, flies off, ſtrikes the ſenſe of ſmelling with a putrid ſtench, tinges and tarniſhes ſilver, &c."

"§ 136. That here is a perfect decompoſition of ſulphur, is evident from this; that without adding an acid, ſuch a ſolution can not be revived into ſulphur; whereas, upon reſtoring what the alcali deſtroyed, an acid, all ſuch ſolutions yield a precipitate of ſulphur. And an inconteſtable argument, that the Phlogiſton is totally diſengaged from the acid by an alcaline ſolution is this, that expoſed to the fire, no ſulphur ſublimes, but the Phlogiſton, in it's own proper form, eſcapes; which it likewiſe does by time in the open air, leaving a neuter ſalt, compoſed of the acid baſis of the ſulphur and the alcaline ſalt, behind."

"§ 137. From theſe conſiderations, it appears, that it is not the concrete, ſulphur, but one of it's principles, the inflammable, that produces the change in ſilver; and that this is produced in like manner by all bodies, from which this principle is, in this form, detached: Thus putrifying bodies of all kinds, excrements of animals, jakes and ſewers in cities, bilge and other putrified waters in ſhips, &c. produce this effect; without being, from this circumſtance alone, to be deemed ſulphureous. Thus likewiſe the yelk of an egg boiled or roaſted hard, tinges ſilver, firſt yellow, and then tarniſhes it further, without bearing any relation to brimſtone."

And p. 316, § 253, "Some are very attentive to the extracting ſulphur from the reſiduum of this and ſuch like (*Bath*) waters; not knowing that ſulphur, when actually diſſolved in water, is decompoſed in the evaporation; the Phlogiſton flying off, while the acid unites with and ſaturates the alcaline ſalt, by whoſe means, the ſulphur was diſſolved. In order to confirm chemical theory, by experiment, and to be able from facts to contradict theſe inordinate lovers of brimſtone, that lodge this mineral where wiſe nature never placed it, nor art ever found it, and aſcribe to it virtues, which it never poſſeſſed;" and ſo procedes to experiments upon the reſiduum, p. 317, § 254. 66, &c.

The principal conteſt between the learned Doctor *Rutty* and his unequal antagoniſt, with reſpect to *ſulphureous waters*, is ſummed up here. And it would have well become the gentleman and the chriſtian to have ſtated the whole fairly, and to have confuted it, or confeſſed the weight of the arguments.

But obſerve the Doctor's anſwer, and ſee whether it ſavors moſt of perverſeneſs or ignorance! You ſay, p. 16. *the decompoſition of ſulphur in the alcaline ſolution is altogether imaginary and unchemical.* And this you endeavour to ſupport by arguments, in which you think it beneath you to do me common juſtice, for you are not contented with perverting my words and meaning in the firſt, but make me ſay what I neither did nor could, in the ſecond; give me leave to do juſtice to myſelf and the public, by explaning myſelf.

As to your 1ſt, if the *Phlogiſton* were not diſengaged from it's acid baſe, when this is ſaturated with an alcali, the *Phlogiſton* could not fly off, as it always does by fire or time in the open air, leaving a neuter ſalt onely behind. This ſhews, that the ſulphur is actually decompoſed and the *Phlogiſton* actually diſengaged, ſet at liberty, in the ſolution. And that there is no way of reuniting the later to it's baſe, ſo as to extract ſulphur from the alcaline ſolution, or in a more proper phraſe to *regenerate ſulphur*, but by overcoming the alcali, by adding a redundance of acidity; when, the *Phlogiſton* reſumes it's priſtine connexion, and gives us again ſulphur, in an other form. Pray, Sir, *how is this contrary*, as you aſſert, to daily experience in making *lac ſulphuris*? Is not this the method and the reaſon of the proceſs?

In your 2d, you pay the like regard to truth and juſtice! Pray where have I ſo much as *ſuppoſed, contrary to the doctrine of the affinities of bodies reported by my ſelf*, Eſſay on waters, P. I. p. 11, *the* Phlogiſton's *quitting it's own acid and leaving it to unite with the alcaline ſalt*, as you are pleaſed, as elegantly as truly, to aſſert? Have I not told you, that when the union of the acid and alcali are formed, the Phlogiſton flies off, if not reſtrained in time by the interpoſition of a new acid? I hope, this can onely be imputed to a failure of your memory. I am ſorry for your loſs, as no man can ſuſtain it worſe.

As to your 3d, it is but an aſſertion of yours againſt one of mine, ſupported by the common conſent of the firſt chemiſts of this and the laſt century. And while we are ſpeaking of ſulphur and *alcalies*, why clandeſtinely ſlip in *lime?* I beg your pardon, I too, in my turn have forgot: *Lime* and *every abſorbent* earth is ſometimes an *alcali*, with you, as every thing that *burns* and *ſtinks* is ſulphur.

You reſerve for the cloſe of this refutation of my objection, an argument, which you think of great force, as you take it from an adverſary's words. Now, becauſe I find, that you have no ſort of rational or true idea of this matter, I will take ſome pains to inform you, though you have already given me many proofs, that my labors, with reſpect to informing you aright, muſt be vane.

The quotation you reſt for your purpoſe, with your accuſtomed regard to candor and to truth, ſtands thus; *Eſſay* on waters, P. III. p. 188. *ſpeaking of the lower ſprings of* BORSET. "*Wherever this ſpring in its current*, touches the wood, or the lower ſprings ouze from the ſoil, theſe places are covered over with a white, ſoft, ſilky hoar, which ſome have taken for ſulphur: But upon a cloſer examination, I find it to anſwer the deſcription of RAYS fineſt and ſofteſt crow ſilk. I found it of all colors. But in the ſtreams of theſe thermal waters, it appears generally white. This might well, as it does with ſome, paſs for ſulphur; for, being dried and thrown upon an ignited iron, it catches fire, emits a blew flame, and an intolerable acid vapor; after which, the little filaments of the plant take fire and burn in their proper manner. So that this is evidently, no more than this minute vegetable, incruſted with ſome particules of fine, ſubtil ſulphur."

This is your great argument to prove how inſeparable the parts of ſulphur are; that this is a complete ſolution of ſulphur, upon your own *fixed* principles; ſuch as *reſiſts the action of the ſun*, I wiſh you had ſayed, moon and ſtars, and the motion of the earth, as you ſay, *air* and *winds, and not ſeparable but by the force of fire.* Here you make your triumphant exultation over a proſtrate antagoniſt; when you ſay, *ſuch is the glaring evidence of truth, that it will out, even from the mouth of an adverſary in ſome of his unguarded moments.* I have ſomewhere ſeen in a farce, a thing ſomewhat like a man, with a patch work, parti-colored coat, called an *Harlequin*, tickle himſelf to death. How happy is it for the world, that upon this exultation, the great Doctor *Rutty* did not hug himſelf to death. Shall I ſay, my learned friend, that you read but title pages or heads of chapters? or that going through a work, you either ignorantly or deſignedly pervert or ſuppreſs truths? To this alternative, you ſeem to have brought yourſelf by overlooking or ſuppreſſing the ſubſequent paragraph. Let not the ſight ſhock your eyes or move your tender conſcience to too ſevere remorſe; read, learn and confeſs where the force of truth and reaſon lies. I hope the following recital will not offend any other reader, as it naturally, immediately follows the preceding; p. 189.

§ 13. "Notwithſtanding this, the water is generally deemed void of ſulphur; though it's ſmell and products indicate the contrary; and though the ſediment depoſited in the ſtream be black, like that of *Aken*. Moreover," "§ 14. 1. It ſmells and taſtes like the thermal water at the fountane at *Aken*; but ſomewhat leſs offenſive. And as I had occaſion to viſit it very often early in the morning, before any body elſe had been there; I ſometimes found diſtinct flakes of the ſame kind of ſulphur, I gathered on the vaults of the ſources at *Aken*, that had newly dropped from the pipe, and layen under it in the well. I found and gathered there, one morning, three drachms of very perfect, pure ſulphur. Whence, I conclude, that ſulphur is generated and formed in this ſource, as at *Aken*; and that increaſing, till it comes within the reach of, or falls into, the courſe of the water; it is at length thus waſhed away by the current and diſcharged."

Now, good Sir, recollect your judgment, or conſult your *junto* for it, and ſee, whether or not there be any thing in this repugnant to my doctrine or favorable to yours? When in the hollow ſpaces over theſe ſprings, the ſulphur is generated and concretes, as we find it in the vaults of the ſources at *Aken*, muſt it not in time come into contact with the current of the water, and muſt it not be brought away either in larger and groſſer portions or in ſuch a comminuted ſtate, or *ſo fine and ſubtil* as to be depoſited upon the mouths of the channels or ſprings. Is this what bears analogy to *Chrouet's* ſolution, improved upon by our learned profeſſor and you? Is not this water the ſame with that of *Aken?* Does ſulphur ſubſide, precipitate, or otherwiſe ſeparate from either by expoſing to air, or fire, or being ſet at reſt? Go to! take ſhame and be ſilent!

Your anſwers to the objection, you ſtile the fourth, p. 17, 18, 19, 20, are ſo fully anſwered in the preceding parts of this letter, as well as in mine *Eſſay* on waters and *Analyſis* of your *methodical ſynopſis of mineral waters*, that I ſhall ſay no more to it here, than curſorily and ſlightly animadvert on your charge of caſting an *high ſcandal* and deep *calumny* on the waters you call *ſulphureous. Scandalum magnatum!* an heavy crime!

Here you ſeem frightened or hurt by the thoughts of your favorite ſulphureous waters being deeply *calumniated* and *ſcandaliſed.* Cheer up, good Doctor, and learn the different degrees and effects of putrifaction upon different ſubjects, as before hinted to you, and do not imagine that I mean to depretiate *your waters* or any water by calling them putrid, or by ſhewing they do not contain actual ſulphur, or even enough of the principles of ſulphur to be diſcovered by any experiment. I mean onely to endeavour to get the real virtues of waters aſcribed to the true cauſes. I do not compare mineral waters acquiring Phlogiſton from putrifaction, to ſewer and ditch waters. And I mean to ſhew, as I have done before, that as the virtues of *Aken* waters greatly depend upon the principles of ſulphur in them; ſo the highly eſtimable virtues of *Bath* water ariſe from it's being void of ſulphur in every form and ſenſe. See *Eſſay* on waters, P. III. p. 320. and following.

And that you may not think the waters *you call ſulphureous*, *ſcandaliſed*, I never denied their virtues. And to ſhew you that I look upon them to be impregnated upon my principles, I have often preſcribed to the poor, who could not purchaſe the natural waters, ſea water with an handful of ſea wreck putrified in a caſk or jar; and ſometimes common water, impregnated with *ſoda* or kelp, with any wholeſome appropriated vegetable putrified in like manner. And I not onely found, that theſe artificial medicated waters anſwered all the trials, that the waters you call *cold ſulphureous waters* do; but in effects, internally and externally, anſwered all the moſt ſalutary purpoſes of *Harrigate*, *Moffat*, *Swadlingbar*, &c. Yet I can not call them *ſulphureous*, while I aſcribe much of their medicinal efficacy to the *inflammable principle*, diſengaged by *putrifaction*.

While theſe laſt ſentences have acquitted me of intentional *ſcandal and calumny*, the poſitions laſt made ſerve for a ſufficient anſwer to your third *ſection*, in which you give us, your *poſitive proofs of ſulphur in waters*; from p. 20, to 27, every one of which have already been expoſed, except ſome inſtances of ſulphur ſublimed from the ſediments of certain waters, and ſulphur found in different kinds of ſtone, in various parts of *England* and *Ireland*. This was never denied. But it has not yet been ſhewn, how, when, or where *ſulphur*, was *actually* or *ſubſtantially* diſſolved in water. ' So that till this is done, though tuns of the mineral were found in, under, and about the waters, till they are found upon proof actually capable of diſſolving it, or are really ſhewn impregnated with it, no bare aſſertion upon the word of a prieſt or a phyſician is to be taken. Your quoting all the antient as well as modern writers to prove that lakes, rivers or ſprings lye upon beds of ſulphur or carry fine ſulphur in their courſes, of which I give you ſome inſtances at *Borſett*, can be of no ſort of weight with me, till you prove the water capable of diſſolving or actually impregnated with, the ſulphur. But this has not been attempted by you or any of thoſe you ſo ſervilely copy. So that you may as well ſay, water muſt be impregnated with flint or pebbles, as with the brimſtone it thus runs over. This however, I muſt think, like other arguments thrown away on a man, who confounds principles with *mixts*, *compoſites*, and *aggregates*, and with whom, every fluid in the creation, from rain water to *cow's piſs*, is in his eſtimation and upon his principles and proofs, *ſulphureous*. But, let me ſhew you, how even Bath water may be made in *your ſenſe*, ſulphureous. Let about an ounce of the *ſcum* of the water, falſely called it's ſulphur, and what makes it's mud, be cloſe ſtopped in a bottle of the water. In a few days, in hot weather, this will putrify ſo, that upon opening, it will ſtrike the noſe with the ſmell of a ſulphureous water; it will inſtantly, ſtrongly tarniſh ſilver, and yet give a deep purple with the infuſion of galls. This happens to the ſeveral Baths at *Bath*, when their ſources are ſuffered to grow foul. I leave you to explane the phaenomenon and apply it to your purpoſe. You cloſe this ſection, in which it muſt be confeſſed, you labored very hard, as you ſee you have ſet me hard to anſwer you, with letting looſe one of your freſh forces ſingle upon me, when you judge, I muſt be blown. This ſurely is not fair, at foot ball. Your learned correſpondent's letter extends from p. 27, to 35. And his notions of the principles of bodies, and the natural chemiſtry of *Aken* waters ſeem no better founded than his ill-natured ſarcaſms. But, as he does not want for ſenſe, ſo much as he ſtudies to ſuppreſs it, and writes Engliſh, I ſhall ſay a few words in anſwer to his epiſtle to you againſt me.

He ſpeaks to two poſitions of mine; the firſt in contradiction to thoſe, who conſider ſulphureous waters as ſolutions, analagous to artificial ſolutions of ſulphur in water, by the means of alcalies. This, he ſays, you have perſonally convinced him, and I hope your ſelf, contrary to the doctrine of your *ſynopſis*, to be falſe, by the *poſitive experiment you mentioned* to him; Mr. *Barton's*, I ſuppoſe. That notion, therefore, he gives up. And ſo I hope do you, ſince Mr. *Barton's* laſt illumination of you. Will you correct your *ſynopſis* by this? For, ſure no man dwells more upon theſe poſitions, than Doctor *Rutty*.

The ſecond is that on which he chooſes to build, to wit, the poſition, *that* Aken *and other* waters *denominated ſulphureous*, are *not impregnated*, in the manner, *you* and *your predeceſſors* and *junto* contend, with *actual ſubſtantial ſulphur*, but with the *elements* of that *concrete*; from which there is a *generation*, *not a ſublination*, of ſulphur in the *vaults* of the ſources. As I muſt ſuppoſe the learned gentleman chooſes to expreſs my meaning, I take the liberty to uſe mine own expreſſions, as leſs vague and indeterminate, though not ſo florid or elegant as his. And for this, there is a very obvious neceſſity, when in the few places, where the learned gentleman is pleaſed to quote mine *Eſſay* on waters, he chooſes in the moſt material parts to follow your example, and content himſelf with reciting ſcattered fragments of arguments, ſentences and paragraphs.

I flatter myſelf, with great deference to your very worthy correſpondent, that had he quoted me fully and fairly, and underſtood me properly, he would be ſilent on a ſubject, to which he appears to be almoſt as great a ſtranger, as Doctor *Rutty*.

His firſt quotation is with reſpect to the ſulphur in the Baths of *Aken*, *Eſſay* on waters, P. III, p. 33, § 77.

The ſecond is concerning the ſenſible qualities and the impregnation of the waters. Ibid. p. 53, § 160.

The third is with relation to the impregnation of theſe waters with ſulphur, and the manner in which it is produced in the vaults; and here, the gentleman thinks it neceſſary to direct the force of his arguments againſt a ſhort fragment of a paragraph, whoſe ſtrength and energy is proved by the preceding and ſubſequent paragraphs, from which it can not be ſeparated without violence and trouble, even to the reader. This your correſpondent takes from *Eſſay* on waters, P. III. p. 69, § 195, in the following words; ***but I am induced to think, that there is no ſulphur actually or ſubſtantially diſſolved in the water, but that the principles of that foſſil***, viz. ***the*** acid ***and the*** Phlogiſton, ***are blended with the waters.***

Now, the paragraph, from which this is taken, is numbered not onely 195 but 4 alſo, as it is the fourth inference from a preceding argument, particularly in the foregoing article, No. V. and § 191. which form a chain of obſervations and reaſonings, from which a ſingle link muſt be forced to ſerve the purpoſes of Doctor *Rutty* and one of his *junto*; and this ſeemingly to hide ſucceding arguments, which muſt have ſilenced all that could not bring new proofs from the ſpring. The cited § ſtands thus; 4. " this collection of ſulphur has always been, and though I demonſtrated the contrary to all the phyſicians of the town, before the magiſtrates, who deſired them to attend; ſtill is, looked upon to be the reſult of ſulphur ſubſtantially diſſolved and ſuſpended in the waters, and by their heat, ſublimed in the vaults of the ſources and aqueducts. But, I am induced to think, that there is no ſulphur actually or ſubſtantially diſſolved in the water; but, that the principles of that foſſil, to wit, the Acid and the Phlogiſton, are blended with the waters, yet ſo, as not to come into ſuch a contact as is neceſſary to occaſion the union requiſite for the production or generation of actual ſulphur, till both theſe volatil parts flying off together are confined in the vaults, ſo as the union and conſequent generation is readily brought about; and that for the following, among other reaſons; See § 196 to 205 &c." How fair this is, let any but the author and Doctor *Rutty* judge.

But, the author himſelf ſeems partly ſtaggered, and as may be ſuppoſed, by the very reading, which he ſuppreſſes; and ſo, taking every thing for granted, which is aſſerted, he ſtops onely *at the method by which the pureſt ſulphur is produced from theſe waters*; and ſaying, *the author having reduced the debate to* this *one fact*, he procedes to examine how this is explaned, according to premiſe. And after a ſhort comment upon my promiſe of explaning the production of ſulphur at *Aken*, in a different light from thoſe who went before me; in order to follow your example, and ſerve yout purpoſe ſtill, takes but a fragment of a whole ſection. I ſhall take the liberty of citing the whole paragraph, which every one muſt confeſs to be in it ſelf but a fragment, and point out the portion, which this ingenuous gentleman is pleaſed to take, by marking it in italics.

" Theſe extraordinary effects then, are produced by the volatil parts of theſe waters. Experiments convince us, that this can not be done by the acid alone. It muſt then be from the *Phlogiſton* or inflammable principle. The onely means, by which art is capable of impregnating water with ſulphur, is by diſſolving that mineral in an alcaline ley, or volatile alcaline ſpirit. Such a liquor with it's vapor, has nearly the ſame properties of tinging braſs and ſilver with theſe waters ;" all this the gentleman leaves out, regardleſs of it's reference to preceding experiments, and onely takes up this part of the ſentence, "*but, in theſe waters, there is not ſo fixed and permanent an union of the acid and inflammable principle, till both fly off together, and uniting, form the ſulphur, which till now, has been looked upon as flowers of ſulphur, the product of ſublimation; which I ſhall demonſtrate to be abſurd, as it is impoſſible.*" ESSAY on waters, P. III. p. 72, § 205.

In the following paragraph, the firſt on p. 30. the gentleman gives us to underſtand with a flouriſh of oratory, that *after having read my book with his beſt attention, he was not able to find one ſtep of the* promiſed *demonſtration.*

Now, Sir, give me leave to ſhew your worthy correſpondent's regard to truth. I venture to aſk him, you, or any of you, the following ſimple queſtions;

1. Is not a vitriolic or ſulphureous acid demonſtrated in *Aken* waters, by it's producing a ſtalactitical incruſtation of the vaults, with the lime in the mortar? a martial vitriol and alum, with their proper baſes? the deſtruction of linen and paper? and the whitening ſilk and wooll? with ſome other circumſtances by common obſervation, *Eſſay* on waters, P. III. § 183.

2. Is it not experimentally demonſtrated, that the vapor of the chief Bath ſaturates an alcaline ley and gives a kind of vitriolate tartar? Ibid. § 185.

3. Is it not experimentally demonſtrated, that theſe waters are highly impregnated with *the Phlogiſton*, in a diſengaged or inconnected ſtate? as well as with the *univerſal acid*? § 189. 190, § 206. to § 223.

4. Is it not univerſally confeſſed by all the rational writers of chemiſtry, as well as proved by experiments, that ſulphur conſiſts of about fifteen parts of the univerſal or vitriolic or ſulphureous acid and one part of the Phlogiſton? And are not theſe conſtituent parts demonſtrated to exiſt, not in a conjunct, but in a ſeparate ſtate, in the waters? Ibid. § 192.

5. Is it not demonſtrably proved from the form and manner of the production of the *Aken* ſulphur, that it is not a ſublimation, or flowers of ſulphur? Ibid. § 194, 195. And if the water were impregnated with ſulphur in your manner by ſolution; have you not learned, that no proceſs of ſublimation or deſtillation known, can raiſe a ſingle grane of ſulphur from the ſtrongeſt ſolution, even from the liver of ſulphur?

6. Is it not by the premiſſes proved, that *Aken* water is not ſuch a ſolution of ſulphur as you contend for in your *ſynopſis*? and that it abounds with the conſtituent parts of ſulphur diſengaged or inconnected? Ibid. § 196. 1. § 197. 2.

7. Is it not known to the moſt ignorant in chemiſtry, that *ſulphur* muſt be *fuſed*, before it can be *ſublimed*? And that no ſolution of ſulphur known, can yield ſulphur by ſublimation or deſtillation? Then, is it not proved, that the waters of *Aken* are not capable either of fuſing or diſſolving even their own fine ſubtil ſulphur; much leſs of ſubliming or any way raiſing it; ſince it is found to lye at the bottom of the ſource for years, when it is not by human means removed? Ibid. § 198, 3.

8. Is it not proved by experiment, that neither the common flowers of ſulphur with the thermal water, or their fine, ſubtil native ſulphur, is fuſed or ſublimed in theſe waters, in their natural ſtate, or even when raiſed to a boiling heat? Ibid. § 200, 1. 201. 202, 203.

9. Is it not experimentally demonſtrated, that no alcaline ſolution of ſulphur can yield ſulphur by ſublimation or deſtillation, even when the acid of vitriol is added? Ibid. § 204.

10. Is it not then an inference as *modeſt* as it is *rational*, drawn from ſuch experiments and conſiderations, "that they leave no room to ſuſpect that the waters of *Aken* contain any ſulphur ſubſtantially diſſolved, or that the ſulphur found in the vaults, is the reſult of a natural ſublimation? And that it's production can not, in my judgment, be accounted for in any other manner, than that of a *generation*, which is eaſily conceived, when the component parts of ſulphur are demonſtrated in the waters, *in the natural ſtate, and in time to fly off from them*." Or to add, "that from any thing I have yet been able to collect to the contrary, from mine own little experience, or that of the moſt famed authors, I ſee no reaſon to ſuſpect there are any waters known, in any other manner impregnated with ſulphur." &c.? Ibid. § 205. Yet theſe are the words you cenſure!

Now, if the actual exiſtence of the component parts of ſulphur be proved in the water, and by the interpoſition of this fluid, kept from uniting; if theſe be proved to fly off from the water together, ſo as to be collected in a cloſe vault, where no watery vapor can be ſuppoſed to riſe; if actual ſulphur can not be deſtilled or ſublimed with or from water, however it be impregnated thereby; If the attraction of the principles of ſulphur be ſo ſtrong, that wherever they are brought in a ſubtiliſed or detached ſtate, into contact, they unite, as the common experiment for the generation of ſulphur proves; may it not be rationally concluded, that the production of the ſulphur of *Aken*, from the waters by ſublimation, is *as abſurd, as it is impoſſible?* and that the onely means of accounting for that production is in the way of *generation*, as it is called, from a coalleſcence and union of the demonſtrated conſtituent parts of that concrete? Is not this giving all the demonſtration of which the ſubject is capable? Would your correſpondent or you ſee ſubtil inviſible eſſences in the act of uniting? Is there any way of proving ſuch an union in the artificial generation of ſulphur, or in the reduction of metals, but from the effects? By giving due attention to theſe obſervations, and true anſwers to theſe *queries*, let the ſequel of your correſpondent's very learned and elaborate letter ſtand or fall, in the eyes of the diſpaſſionate judicious. To ſuch, it is ſubmitted, whether in theſe experiments or obſervations, or diſcoveries, there be any thing like the *immodeſty* and *ſelf-ſufficiency*, any thing *unphiloſophical*, or any attempt or *intention to paſs myſelf upon the world for the moſt able phyſician and chemiſt*, ſentences, which this gentleman, from his abundant ſagacity, candor, judgment and politeneſs, is pleaſed to paſs upon me?

The fourth ſection is a medley rhapſody, which wherever it is intelligible may be judged of by comparing the quotations in broken ſentences to the original text and context of the work controverted.

In the firſt paragraph, you confeſs, with me, *that ſulphur does not ſo far predominate in Bath as in the waters of Harrigate and Aken.* Yet aſſert, in contradiction to me, that the waters *of* Bath, *as well as of* Aken, *really contain the principles of ſulphur*? Are you never to be ſet to rights? Suppoſe I ſhould confeſs, that all mine experiments demonſtrate this, what would it avail you, in the ſupport of your crude, miſtaken notions? I have proved the water contains the volatil, univerſal acid. But where is the *Phlogiſton*? In the *oily matter*, common to all waters, with this! Is it detached or diſengaged, ſo as to produce any one fair effect of *Aken* water? If you know any thing of it, your heart, whatever your tongue or pen may do, muſt anſwer in the negative.

In your 36th. p. You have the virtue to take ſome ſhame to yourſelf, and to retract a groſs error in your account of Bath waters. If this fit of candor had but continued on you, you might have got ſhut of more prejudices. Correct your *ſynopſis* by this.

But, on the oppoſite page, you ſhew your candor was not permanent. There, you go again into your former crude notions of founding the virtues of Bath water upon it's *ſulphureous* or *phlogiſtic* impregnation. Whereas, if you attend to the true compoſition of the water, and it's daily effects, particularly in vague gouts, ſpaſms and paralytic affections ariſing from choleric or bilious diſorders, jaundices, cachexies, &c. you will be found, what you would make me, the *ſcandaliſer* and *calumniator* of theſe waters: For, were they, inſtead of *Subacid* and *Chalybeate*, *ſulphureous* or *Phlogiſtic*, they would be as improper, as deſtructive, as they are proper and efficacious in ſuch diſorders. And thus you would ſee, that *Aken* and *Bath* waters, inſtead of being analogous in qualities, effects and virtues, are in moſt reſpects the diametrical reverſe of one another. See the comparative analyſis of theſe two waters and the uſes and virtues of each, eſpecially the latter, in the *Eſſay* on waters, P. III. § 273. and following.

I will venture to refer it to any candid Reader, whether there be or not any thing from your 36th to your 46th page, that can ſtand upon a fair compariſon with the controverted work. I might have gone further, but that I here and there find ſome points, to which I think it proper to ſpeak a little more particularly.

In the laſt mentioned page, you are pleaſed to ſay, that *Guidott's* experiment on the *Bath Mud* ſhould not be ſuppreſſed. So far from being ſuppreſſed, it is more accurately made in the *Eſſay* on waters, P. III. p. 276, 277. Then, you mention the Bath Sand as a proof of Bath waters, being ſulphureous. Has not this *Mud*, and the *Scum* of the waters, long falſely called *ſulphur*, together with this Sand or diſſolving

Pyrite been fully and fairly examined in the *Eſſay* on Bath waters, P. III. § 110. to 116. § 151. Let me to ſatisfy you ſuppoſe, that inſtead of this *natural*, we found the *artificial Pyrite* made of actual ſulphur and iron, or ſuppoſe, all the ſtones and mortar that compoſe the Baths were actual brimſtone; can you, after what has been ſayed in the *Eſſay* on waters, ſuppoſe theſe waters thence impregnated with *brimſtone?* Are you not made ſenſible, that the *natural* and the *artificial Pyrite* alike give *vitriolic* or *martial*, *not ſulphureous* waters? and that *brimſtone* of itſelf, is *not ſoluble* in water?

Yet ſtill you ſay, *that this* Pyrite, *ſuppoſed to impregnate Bath waters, contains the* principles of ſulphur. Suppoſe it actual ſulphur, it is not ſoluble by itſelf in water. And ſtill you conclude the reverſe, and ſay *it is, from the author's own teſtimony.* Which does this ſeeming diſregard to truth ariſe from ignorance or obſtinacy and vanity? Let this be judged from your groundleſs concluſion, that this is *a notable inſtance of ſulphur diſſolved in water by the chemiſtry of nature*, without *the intervention of an alcali, and ſo beyond the ken of our* Adept, *altho' it is above ſhewn, that art can effect the ſame thing alſo without the help of an alcali*; alluding to Mr. *Barton*'s artificial ſolution of ſulphur; which you elſe where, prove to be done by means of an *alcali* or an *abſorbent* or *calcarious* earth, by your *precipitating* the diſſolved ſulphur with an *acid?* For, have you not told us, *argument*, p. 10. that by the means of the *acid of vitriol*, you *precipitated ſulphur* from *this ſolution*? Yet, you would have us believe, it is *no alcaline* ſolution, nor one performed by *an abſorbent earth?* Could an *acid* cauſe a *precipitation* of *ſulphur* from a *ſolution* of this mineral that was not of *one* of theſe *kinds?* If it can, the diſcovery muſt be Doctor *Rutty's*; ſince all chemiſts hold, what you elſe where have received, that all *alcaline ſolutions* are *precipitated* by *acids, and all acid ſolutions* *precipitated* by *alcalies*. But who will diſpute with you the power of reverſing the rules of art or nature, for which you ſeem to have a talent not inferior to that of *Molliere's* Faggot-maker ?

Your laſt paragraph, p, 50, is quite worthy of the author of your *Synopſis*. Here, you aſcribe the *precipitation* cauſed by *alcalies*, and that ariſing upon the throwing of *ſugar of lead* into *Aken* water, to *one* and the *ſame* cauſe, though they be both produced by quite contrary cauſes. * The cauſe of the different color of the later, you ingeniouſly account for, in a *method*, *curious and new* ; " becauſe *the* Phlogiſton *is blended with a large proportion of terreſtrial matter*, *precipitated by the* ſuggar of lead, *being* a precipitator *in common with the white calcarious matter and to the* Phlogiſton, *to which may be added ſome particles of the ceruſs alſo ſuffered to ſubſide*, *as being partly diſmiſſed by the ſuperior attraction of the calcarious earth in the water*.

This, I am ſure, is all your own. None of your *junto* can diſpute it with you. Pray learn from ſome of them, if not from me, that *alcalies precipitate* the *earth*, by *ſaturating* the *acid* in the waters of *Aken*, &c ; but that *lead* and other metallic ſolutions are not the *precipitators* of the *terreſtrial matter*, but are *thereby*, or by the *ſalts* or the *acid* in the waters, *precipitated*. How do you prove *the Phlogiſton* in theſe waters *blended* with *terreſtial matter ?* But if it be, what is the *diſcoloration* of the ſolution of ſuggar of *lead* oweing to, when mixed with the *condenſed vapor* of *Aken* water ? Your *ſuperior attraction* ſtrikes me dumb. It is all your own.

From p. 50 to 54. You may find ſufficient confutations of your own notions and thoſe of others you cite, in the *Eſſay* on waters, in the *Analyſis* of your *Synopſis*, and the preceding parts of this letter, which to avoid repetitions, I ſhall decline reciting.

But, p. 54, I am charged with *inattention in* mine experiments or a *prejudice againſt* Bath water. Let the reader judge of the truth and juſtice of this charge, upon a fair compariſon, and ſee how, whence or wherefore *ſuch a prejudice* ſhould ariſe. See *Eſſay* on waters, P. III. p. 332, &c.

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* See *Eſſay* on waters.

In p. 55, &c. You aſcribe the *tarniſhing of ſilver*, in the open air at Bath, to the *Phlogiſton* in the *Bath waters.* Pray, have you not obſerved ſilver to tarniſh in foggy weather, in twenty four or in twelve hours in *Dublin?* Is it not obſerved by the workers and dealers in ſilver? And ſhall we from this conclude, that the *Liffey water* is *ſulphureous*, or impregnated with *ſulphur* or the *Phlogiſton?* Good Sir, where will you ſtop? Is not the effect in both, from the ſame cauſe, putrid exhalations from animal bodies, or the method of making *Bath Guineas?* Eſſay on waters, P. III. § 140 to 145.

From p. 54. to 63, are made up of unproved, perhaps improbable, contradictions of me, broken recitals, falſe concluſions, and unjuſt compariſons of *Aken* and *Bath* waters, when a comparative Analyſis was layed before you in the *Eſſay* on waters. I ſhall trouble you with no further animadverſion on theſe curious pages, till you come to your beſt proof of ſulphur in Bath water, p. 63, where you come to prove the analogy of Aken and Bath waters in theſe remarkable energic expreſſions. “Again, in *Aken* water, the flowers of ſulphur are collected in the vaults of the ſources of ſeveral of the Baths: in the *Bath* water, the ſulphur is moſt manifeſt in the *Sand*, being a compoſition of *ſulphur*, *iron* and *calcarious earth*.” This has been ſpoken to before. Here I ſhall onely obſerve, that the *ſulphur* collected at *Aken* muſt in ſome form and manner have paſſed through the water; therefore, the water muſt have been, if not *actually*, *eſſentially*, impregnated with *ſulphur*. This can not be ſayed of *Bath* water: No *veſtige* of *ſulphur* or the *Phlogiſton* is detected in that water, indeed, ſulphur as well as *iron* is manifeſt in the *pyrite* or *ſand*; but not from thence in the water. And to ſatisfy gain ſayers, take any water you will that is not alcaline, pour it hot as you will on *Bath Sand*, yea, let them be boiled together if you will, and you ſhall have a *Chalybeate*, *not a ſulphureous* water; for reaſons often given you before; yea, put an ignited, *ſulphureous Pyrite*, or even the *artificial Pyrite*, made of filings of *iron* and *brimſtone*, into any water, and the reſult will be a *Chalybeate*, *not a ſulphureous* water.*

I ſhould here have left you to enjoy the complete triumph of ignorance, in your long diſſertation on *Briſtol* water, Section V. p. 63; becauſe throughout the whole, you either miſunderſtand or purpoſely miſrepreſent me. One or two things, however, I ſhall ſlightly touch upon, as you and your *junto* probably lay no ſmall ſtreſs upon them.

You are pleaſed by mine experiments to prove the *Briſtol* water, what I have not yet ſeen or credibly heared of, an *alcaline water*. For which purpoſe, you recite mine experiments indeed, but draw falſe concluſions from them. As, 1. *it cauſes an ebullition with all acids.* So do the waters of *Aken*, and thoſe of *Pyrmont* and *Spa*, called *acidulae* from the predominant acid. 2. *With Sirup of violets a ſea green, gradually heightening to a graſs green?* Solutions of *iron*, *copper* and *alum*, ſtrike a deep green. See the *Analyſis* of your *ſynopſis*. 3, and 4. *It heightens the tincture of rubarb and gives a pale roſe purple with Cochinell.* All which are owing to what you call an *alcali*, your 4th obſervation, which is the earth it depoſites upon boiling or being expoſed to the air, which, with me is *none alcali*, but an *abſorbent earth*, mixed with *ſelenite*. Had you but attended to the rules layed down for trying waters with *ſirup* of *violets*, &c. in the *Eſſay* on waters, P. I. p. 101, 102, and 116; you had not fallen into all this abſurdity. You are forced to confeſs an *acid predominant* in *Bath* water. Yet does it produce a *like effect* with *ſirup of violets*, with that of *Briſtol* water. *Eſſay*, P. III. p. 302, § 202, to § 206.

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* *Eſſay on* waters, P. I. p. 113. § 229. p. 269, 270, 271. § 110. and following.

Thus regardleſs of, or abuſing the experiments of all faith worthy Analyſers of the water, you conclude it to be *alcaline*. And ſee how rational your practice is upon this notion founded! For, p. 81, you tell us, *the operation and effects of* Briſtol *and* Bath waters *are oppoſite*, as *acid* and *alcali*, you ſhould have ſayed: *The* one *being powerfully attenuant*, *deobſtruent*, *laxative and good in caſes where the ſecretions are diminiſhed*, *the other on the contrary*, *is chiefly ordered where the ſecretions are too much increaſed. The firſt is heating*, *the ſecond cooling*, *and ſucceſsfully preſcribed in* hectics, coughs, and the ſcurvy with heat, to which let me add the *diabetes*; all caſes, wherein all Phyſicians, except the learned Doctor *Rutty*, are agreed, *acid things* onely are proper, and wherein no regular practitioner, before Doctor *Rutty*, ever gave *Alcaline* waters or other medicines of the like nature. Who will not ſubmit to your authority in this, among other, *new* diſcoveries! ſure this requires no further commentary.

You are pleaſed to take upon you to vindicate the titule of this water to *Calcarious*: Yet you muſt confeſs, that except the *Pfefer* Baths in *Switzerland*, *Buxton* and *Malvern* waters in *England*, there are none that contain leſs of ſuch an earth.

But the diſcovery of a *ſelenite* diſturbs you much, becauſe, as I ſuppoſe, it is not your own. Good Sir, before you expoſe yourſelf further, look into all the modern chemiſts, who touch on this ſubject, and you will find, that all waters, by the means of the vitriolic acid, charged with abſorbent earths, upon evaporation, yield a ſalt-like ſubſtance, which is found inſoluble. By ſome of the *French*, it has been called a ſalt, from it's appearance, though improperly, as it is not ſoluble in water, after it once cryſtalliſes, as far as art can determine. A ſubſtance analogous to this is produced, when to any lighter acid, ſaturated with any abſorbent earth, the vitriolic acid in the more concentrated ſtate is added. Then, what you would call a precipitation enſues. But this with chemical philoſophers is a cryſtalliſation, ariſing from the ſtronger attraction between the heavieſt acid and the earth diſſolved in the lighter. And this criſtalliſation, being found inſoluble in water, obtained the appellation of that ſubſtance in nature to which in form and qualities it appeared to bear the ſtrongeſt analogy ; and this is *ſelenite*, among chemiſts *. Now, this is evident in all the waters, you call *calcarious*, and in none that I know, in a greater proportion to the other terrene parts than in thoſe of *Briſtol*. Hereafter you may, perhaps, change your mind as far from *your argument*, as this appears now to differ from your ſentiments in your *Synopſis*. Who knows but you may then call your *Calcarious*, *Selenite* waters. That there are *Calcarious* earths, though no *calx* or *lime*, in nature, is confeſſed. But why waters ſhould be called *Calcarious* for having ſuch an earth, not a lime, diſſolved in them, is ſubmitted to the judicious. But as you give waters titules from the bodies they run over, without regarding their being or not being capable of diſſolving them, or from thoſe bodies that are mixed with, not diſſolved in the waters ; why may we not ſee you hereafter give waters the epithets of *loam*, *clay*, *pebbles*, *flint*, as well as of *cryſtal*, *brimſtone*, &c. which you do from no better evidence ?

But, I find, you have as ſtrong a propenſity to make it *ſulphureous*, p. 77.

Heretofore you contended, and promiſed to prove, from mine experiments, *Briſtol waters*, *alcaline*. See how you ſucceded above, p. 94. Now, you are for giving them, not onely the *Phlogiſton*, but the *volatil*

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* *Eſſay* on waters, P. I. p. 93, 94, § 183.

latil vitriolic or *ſulphureous acid*, conſequently the *principles of ſulphur, as well as to* Aken *waters*. And though you before contended for their being *alcaline*, you now find new proofs of their *acidity*, by your practical obſervations, *Argument* 78. Let who will comment upon this; I ſhall not.

Nor would it be a better compliment to take up any man's time with expoſing your proofs that it contains the *Phlogiſton*, and is of courſe a *ſulphureous water*, as well as that of *Aken* Baths. *Argument*, p. 78, 79, 80.

You firſt make it *alcaline*, then *Calcarious*, afterwards *acid*, and then *ſulphureous!* To the laſt poſition, you give this clinching proof, p. 81. "The laſt evidence of the *Phlogiſton* in *Briſtol* water is, that the inſoluble part of it's reſiduum obtained by exhalation, *ſmells ſulphureous* on the *red hot iron*, *ſparkling* and ſometimes *emitting a flame*." Here is Doctor *Rutty's Phlogiſton* or ſulphur! In order to avoid confuſions of this kind hereafter, let me recommend your looking again over the account and qualities of the Phlogiſton in waters in the *Eſſay*, P. II. p. 17 to p. 22. This and ſome few paſſages more in the ſame tract, if attended to without prejudice, might have ſaved you, and your *junto* much pains as well as diſgrace. Why not a *notable ſpecies of Brimſtone?*

After what has been already ſayed in the *Eſſay* on waters, in the *analyſis* of your *Synopſis*, and in the preceding parts of this letter; it would be no better than folly to argue further with you on this head. Let me onely aſk, what *animal* or *vegetable*, what combuſtible *mineral* production is not, with you, *ſulphureous?* In this point, you ſervilely copy your friend Doctor *Charleton* of *Bath*, who finding an *unctuous* or *oily matter* in that water, pronounces it *impregnated with ſulphur*. I ſhall again in this place apply to you, what I have ſayed to him before, * and to you ſince. " But, if this oily matter be *ſulphur*, and every water that contains it, *ſulphureous*, it would be kind of this moſt learned gentleman, it would become his function, to point out a water in *Britain*, quite *void* of *ſulphur*, one that *is not*, in his ſenſe, *ſulphureous*. I ſhould think ſuch a water a greater curioſity than thoſe of *Bath* or *Aken* : For I doubt, ſuch has never yet been found upon earth, nor dropped from the Heavens. At leſt, I will anſwer for it, there is no water in or about *Bath* or *London* free from this kind of ſulphur."

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* *Eſſay* on waters, P. II. § 25. to 27. P. III. p. 321. § 260.

As to the contradictory experiments, let them reſt upon the different degree of credit due to each of us, till ſome competent, diſpaſſionate judge declares who is right and who wrong.

Forgive my overlooking your long elaborate table; becauſe the principles on which you proceded, as well as your manner, are altogether irregular and erroneous.

Your obſervations on this table can not be better ſtated and founded than your experiments, therefore I ſhall paſs them over as not worth notice.

Your ſixth *ſection*, in which you ſay, you have inveſtigated the Phlogiſton in the waters of *Bath* and *Briſtol*, I preſume, more than anſwered in the preceding. So let that paſs.

If the public be not obliged to me, ſure you are, for putting you under the neceſſity of learning and telling the world, that you have learned ſomething of the nitres of the antients and moderns, ſince you gave us your great *Synopſis* : For, at the time of writing that, it is plane you knew nothing of the matter, by the claſs you make of *Nitrous waters*. Your introduction of this ſection is like yourſelf. Give me leave to exhibit it to your review. " After all theſe altercations with regard to *ſulphur*, I do not know but it may be poſſible that our author and I may happen yet to ſhake hands on the ſubject of *Nitre* ; being actually agreed in three important points, &c. *Argum.* p. 95.

Now, why have you not agreed upon the important points inconteſtably ſtated with reſpect to the definition and diſtinction of the *Phlogiſton*, the *oily matter* and *ſulphur*, which you notwithſtanding every where confound together? You have as good evidence for the one as for the other. But it ſeems, the hour of your converſion is not yet come. However I rejoice at your information, and think it is time you ſhould correct your *Synopſis*, even by the little light, you appear to have ſince received, with reſpect to *Nitre*, in your *argument*, p. 95, to 103.

But, you are no where ſo ſolicitous to ſupport your own poſitions as to ſubvert mine. I ſhould have found no fault with this, had it been done with proper regard to candor and to truth. But, you aſſiduouſly acquit your ſelf of the imputation of either, throughout your work, but in none inſtance more remarkably, than in your *argument*, p. 103 and ſequel.

You are here pleaſed to charge me with confounding together *Glauber* and *Epſom* ſalts, of courſe, not knowing the difference between the one and the other, and in p. 105, *with confounding matters and words*. If this were true, I ſhould for truth's ſake acknowledge the correction, with due reſpect to the correcting hand. But unfortunately for you, it will appear that you make theſe charges againſt the man from whom you firſt learned the difference and diſtinction between theſe *two ſalts*, between *ſulphur* and *pitch*, or *greaſe*, between *volatil ſteel* or *vitriol*, and the *volatil mineral acid*, as well as an idea of *magneſia alba*. But to the point:

That I have placed the *natural* and *artificial bitter purging ſalt* of mineral waters, and *Glaubers* ſalt often together, is onely becauſe they are often, if not generally found together in one, and the ſame water. And this cannot be otherwiſe when the baſis of *Epſom*

ſom ſalt, a kind of *magneſia*, and the baſe of ſea ſalt, the *mineral alcali*, meet with the *vitriolic acid* in one water, enough to ſaturate both the baſes, in which alone, theſe ſalts differ.

Now, I can not think you hardy enough to deny your having throughout the writings which you ſo ſeverely cenſure, occaſionally met with the compoſition and analyſis of *Glauber's* ſalt, as well as of that of *Epſom*. I dare ſay you could turn to as many of theſe proofs as I. But to ſave you ſome trouble, though to give you ſhame, I ſhall beg leave to recite the few inſtances that at preſent occur to me.

1. Then, in the general idea of ſalts, p. 16, the different effects of ſaturating the vitriolic acid with the artificial and native fixed alcalies are ſhewn, the one *vitriolate tartar*, the other *Glauber's* ſalt.

2. In p. 19 and 43, the union of the vitriolic acid and the baſis of ſea ſalt, the mineral alcali, is ſayed to produce *Glauber's* ſalt; as the breaking this union by the interpoſition of the *Phlogiſton*, the *generation* of ſulphur, and the *volatiliſing* the *fixed heavy acid* of *vitriol* by the means of the *Phlogiſton* are ſhewn in the following part, without the oſtentation of learning, in you and your *junto*, in quoting *Langius* and others upon the like occaſion *.

3. In the *Eſſay* on waters, touching *ſalt ſprings*, § 42. The manner of making *Epſom* ſalt is ſhewn, from the ſalt ley, or ſolution of an abſorbent earth in the muriatic acid, which being evaporated and expoſed to the open air, to abſorb the univerſal acid, produces the common purging bitter ſalt, called after the natural kind, firſt diſcovered, *Epſom* ſalt. Yet, if the ley ſhould happen to contain any of the baſe of ſea ſalt, then *Glauber's* ſalt muſt be produced.

4. In § 43. The difference and the analogy of theſe two ſalts are ſhewn; in the following words; "Hence

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* *Eſſay* on waters, P. I. p. 14. § 65. p. 19. § 85.

we find the ſubtil acid of the air capable of inſinuating itſelf into this kind of ley, and of forming there a purging bitter ſalt, which bears great analogy to the ſalt of all our purging ſprings, and helps us to account how ſuch ſalts are produced in nature. This kind of ſalt may be obtained in larger cryſtals, by the addition of alum, or the reſiduum after deſtillation of green vitriol, and for the ſame reaſon with the preceding. This bitter ſalt bears ſtill ſome relation to ſea ſalt. 1. In it's ſolubility. 2. In giving ſome marks of the muriatic acid, with ebullition, upon mixture with the concentrated vitriolic acid; 3. In it's precipitating ſilver; 4. In it's yielding a kind of *magneſia alba* by precipitation with fixed alcalies. It's affinity to *Glauber's* ſalt appears, 1. from the figure of it's cryſtals; 2. from it's taſte, 3. from it's fuſibility; 4. from it's *generating ſulphur* upon fuſion with charcoal or any phlogiſtic body, and upon ſolution and precipitation with any acid." p. 45.

5. This matter is ſtill further illuſtrated under the article of *ſaline waters*, § 27, 28 to 37, where the affinities of the ſalts of *Epſom*, *Sedlitz*, *Cheltenham*, and *Scarborough* waters, with the artificial *Epſom* ſalt and that of *Glauber*, are ſhewn.

Are not theſe recitals enough to bring you at once to ſhame, confuſion, penitence and reformation? Amend your manners; correct your books and be ſilent, till you acquire more knowledge, ſome candor and common juſtice, of all which you have ſo induſtriouſly acquitted yourſelf in your laſt *concerto* performance. Now ſee how any conſideration drawn from theſe, can induce you to call ſuch ſalts *Nitre*, and the waters with them impregnated, *Nitrous*. But this you correct by your account of the *Nitre* of the Antients. Inſert it in your *Synopſis*, and thank him who taught you the material Correction! Where there is a real error that might have been wreſted to your perverſe purpoſe, you do not diſcern it. This may be ſeen in the *Eſſay* on waters, P. I. p. 97. where there is an actual miſtake or two, which may be corrected by adding, line 13. before *Glauber*, the common, and line 14, after added, inſerting, what ſome miſtake for. But theſe and many others did not occur to Doctor *Rutty*.

Of a piece with this, are your comments, p, 106, 107. upon my aſſertion in the *Eſſay* on waters, that *Epſom ſalt*, Doctor *Rutty's* Nitre, *has not one property of the Nitre of the antients or moderns.* In which you are pleaſed to ſquint a charge of *imprudence, inattention* to, or *unacquaintance* with the *Nitres* of the *antients* or *moderns*. This will ſhew you as ignorant of, or as averſe to, the truth in this, as in any other inſtance. In this very ſection, VIIth, as well as elſe where in *your argument*, you quote the *Eſſay* on waters, for the ſalt of *Aken* water, which is there aſſerted and demonſtrated to be the *Nitre* of the *antients*. And in many other parts of the *Eſſay*, the mineral alcali is aſſerted and proved to be the *Nitre* of the *antients*, from the beſt authorities Antient and Modern, as well as from comparative obſervations; ESSAY on Waters, P. III. § 382 to § 393. of which you do not vouchſafe to take any notice in your pompous diſſertation on the ſubject. And the qualities, properties and effects, as well as the natural hiſtory of the *Nitre* of the *moderns*, or *ſaltpetre*, and it's peculiar, ſpecific acid, is every where layed down in that work, where the ſubject comes under conſideration. Thus ſtand your charges *of ignorance of theſe ſubjects*, of *inattention* and *imprudence!* See the GENERAL IDEA of SALTS, prefixed to the ESSAY on *Waters*.

You ſay however, that *Epſom ſalt is poſſeſſed of ſeveral diſtinguiſhing qualities of both the Nitres.* Yet you are forced, at the ſame time, to confeſs, *it wants the* alcaline quality *of the* one, *and the* fulminating *or fulgurating* quality *of the* other. Are not theſe the chief *diſtinguiſhing qualities* or characteriſtics, thoſe in which theſe eſſentially differ from all the neuter ſalts? But you are pleaſed to give ſeveral inſtances, in which *your Nitre*, that is, *Epſom ſalt*, correſponds in ſenſible, and ſome other, qualities with the *Nitre* of the Antients and of the Moderns. This makes but a wretched proof of your contradiction. You are forced to confeſs the great, material points in which they differ. But you have a mind to ſhew wherein they correſpond and agree. Theſe are onely in the properties, common to ſalts in general. Now let me inform you, that the ſalts of *Cheltenham*, *Scarborough*, and *Sedlitz* waters, *Glauber's ſalt*, *ſal Polychreſt or vitriolate tartar*, *ſoluble tartar*, the *mineral alcali ſaturated with tartar*, *borax* and many other ſalts correſpond in as many qualities and properties with both the *Nitres*, as *your Nitre*, which is *Epſom* ſalt, can do. Then what is the uſe of this conteſt? Onely to gratify ſpleen and choler; for ſure it can not be altogether the effects of ignorance. If you know any thing, you muſt have known, that all ſalts have many properties in common; ſuch as the ſenſible qualities, ſolubility, fuſibility, &c. But there are hardly any ſalts, in which the diſtinguiſhing properties or generic marks and characteriſtics are ſtronger and clearer than in theſe three, which you ſo diligently labor to confound together, 1. *Epſom ſalt*, or Doctor *Rutty's* Nitre; 2. *Natron* or the *Nitre of the Antients*, and 3. *Saltpetre* or the *Nitre of the Moderns*. See *Eſſay* on waters, P. I. p. 7, 9, &c.

The firſt is a kind of *neuter ſalt*, compoſed of an *earth* and the *acid of vitriol*. This, you allow, and that it *curdles milk*.

The ſecond is a *ſimple, native Alcaline ſalt*, which you muſt confeſs, different from *Neuter*, and that it does *not curdle* milk.

The third is a ſalt conſiſting of a *ſpecific acid mineral ſpirit*, and a *fixed vegetable alcali*, which you likewiſe muſt confeſs, *curdles not milk*.

The firſt extinguiſhes fire, the ſecond lies unaltered in the fire, and the fourth catches fire from an ignited coal, burns with a rapid fulgurating flame and helps to conſume the coal.

Now the properties of one of theſe ſalts are by no means to be aſcribed to either of the others; nor indeed, to any other ſalt. Every thinking man muſt ſee, that though *Epſom ſalt*, Doctor *Rutty's* Nitre, has *many properties* of ſalts in general, it has *not one property of Nitre*, whether *Antient* or *Modern*. Should not this have determined you to acquieſce in truths? O! no; that would not have anſwered your purpoſe: That they *were ſalts*, and had *ſome properties*, though but in *common with others*, was enough for you, to make *Epſom ſalt*, *Natron* or *ſaltpetre*, all one and the ſame. And you took it for granted, from the time and manner of vending your book, that I ſhould never have an opportunity, if I ſhould think it worth my while, to expoſe your writings further to their deſerved contempt and ridicule. I am, however afraid, I ſhall hardly eſcape cenſure for giving you ſerious oppoſition here; ſince a man, who is ſo far from diſtinguiſhing the *elementary Phlogiſton* from the different bodies, whoſe compoſitions it enters; that *this Phlogiſton*, *all oily or unctuous matters*, *bitumen*, *brimſtone*, &c. to him are all *one* and *the ſame*, may well be allowed to confound different ſalts together. See your *Methodical Synopſis* of *Mineral Waters*, and *your argument of ſulphur or no ſulphur in waters*, &c.

I have thus gone through your laſt performance in the compaſs of very few more *days* than it took you and your junto *years* to write this *argument*. And ſhall now bring mine obſervations to a concluſion.

The differences between you and me are too great to ſubſiſt conſiſtently with good *theory*, which muſt generally produce good *practice*, in chemiſtry as well as in medicine. And for the good of the public, the honor of the profeſſion, and the reſpect we owe our ſelves, we ſhould lay aſide prejudices, acknowledge a generous conviction, and be reconciled.

You every where put me in mind of an angry, bad fencer, who ſeeks not ſo much to defend his own body, as to wound that of his antagoniſt. For my part, I declare it, I wiſh not to wound you in any point. But I can not ſacrifice the truth I owe to God, to the World and to my own Conſcience, to complaiſance, more than to caprice.

You call me *your Adverſary*, and no doubt, look upon me as an enemy. I do again declare, you miſtake or miſrepreſent me. I am an *Adverſary* to the errors and vices of every man; while I pity the offender and wiſh him reformed and well. Had I but the friendly intercourſe with you, with which I once was favored, I ſhould take no leſs pleaſure in convincing you, than in being by you my ſelf convinced, of errors, backſlidings, miſtakes and inadvertencies, from which, as a man, I cannot pretend to be exempt: I am not ſo vane. But I muſt ſay, it does not appear to me, that you have yet touched upon one of my errors or miſtakes.

As to the impregnation of any water of which we treat, you muſt confeſs, I lay myſelf open to oppoſition and to conviction, as I give a minute detail of every proceſs, experiment or obſervation, and attempt their ſolutions or etiologies. All theſe, eſpecially the laſt, you carefully avoid.

You found your practice in the mineral waters upon your imaginary inveſtigation of the compoſition, nature and properties of the fluid. I found mine upon the proofs I experimentally give of theſe, and give my reaſonings accordingly.

Now, all the well atteſted cures aſcribed to any water of which I treat, can be accounted for upon my principles ſolely. Whereas upon yours, *Bath* and *Briſtol* waters, with ſome others, muſt eternally fail in the ſalutary effects we daily diſcover, and in many caſes, where they now prove ſovereign remedies, muſt be found the reverſe, were they impregnated, as you contend.

I need not proſecute this diſagreeable ſubject farther. Conſider what has been offered, and ſee how you have fulfilled your manifold promiſes in your copious titule page. Is *the arguvient of ſulphur or no ſulphur in waters* diſcuſſed? Is the *compariſon* between the waters of *Aix-la-Chapelle*, *Bath* and *Briſtol* fairly, fully and juſtly made? Is the *ſulphur reſtored* to the *two firſt*, or firſt and ſecond? And are the contents of the *laſt*, or third, *aſcertained* with a ſomewhat greater degree of preciſion, than in the *Eſſay* of a late ADEPT? And is the credit of other injured waters vindicated from *the Author's* own experiments?

Have you fairly anſwered any of theſe ends? And does not the dirt you attempt to throw upon me, recoil, revert and ſtick to yourſelf?

Do not however imagine, that I am angry with Doctor *Rutty*. Anger is a paſſion you never can move me to. I am ſorry you impoſe upon the unwary world, as well as on yourſelf, in theſe matters. Your manner ſometimes requires a little acrimonious chaſtiſement. When you are prepared for friendly reprehenſion and correction, you may have it, as far as I am capable of giving it. And in return, I am ready and willing to receive and publicly to acknowledge, correction from yours or any other hands.

I was for ſome time heſitating about a titule for this paper. I once thought of intituling it, *The* ADEPT, *to the* INEPT: *A Letter to* DOCTOR RUTTY, &c. But, did not think your example, however weighty, authoriſed it. So I changed it to what you now ſee.

You will pleaſe to obſerve, that I have not taken up a ſingle weapon, nor raiſed any hand, but mine own againſt you. I would not permit even mine Apothecary, who was both willing and qualified, to anſwer you; becauſe I did not think it ſo reſpectful. And leſt of all, could I engage a *junto*, form a *Conſpiracy*, as you have done, and get *men in maſques* to ſtab unwary innocence in the dark.

It is time to let truth prevale and ſtop theſe ill-natured and worſe conducted altercations and controverſies. I am ready to meet you more than halfway in the path of friendſhip. If you wiſh I ſhould come further, lay aſide partiality and prejudice, and embrace fair truth and reaſon. In ſhort, *diſband your Legions*, and coolly *ſubmit your Conduct* and *your Works* to the *Cenſure* of the PROPER JUDGES, as I am ready to do mine; and ſo may you again find

A Friend and Servant,

Dublin,
Dec. 20. 1762.

in

C. LUCAS.

P. S. If you ſhould find yourſelf impatient to know Mr. BARTON's *colorleſs ſolution of ſulphur*, before he thinks fit to inrich the world with the *important diſcovery*, I am ready to ſhew, and explane to you, various methods of preparing ſuch a ſolution; provided you do not communicate any of them to him, till he gives a little better proof of his candor, than putting a *ſecret Club* into an *Enemy's* hand, to knock down an innocent man, *his Friend too*, in the dark.

BRITISH MUSEUM
30 MAY 58

ERRATA.

P. 6, line 29, for with, *read well*, p. 7, l. 27, 30. for ſirrup, r. *ſirup*. p. 8, l. 33, for (who, r. *that*. p. 15, l. 23, for ſirrup, r. *ſirup*. p. 39, l. 19, for ſhow, r. *ſhew*. p. 48, l. 13, for ſubturfuge, r. *ſubterfuge*. p. 54. l. 21, for precipitale, r. *precipitate*.